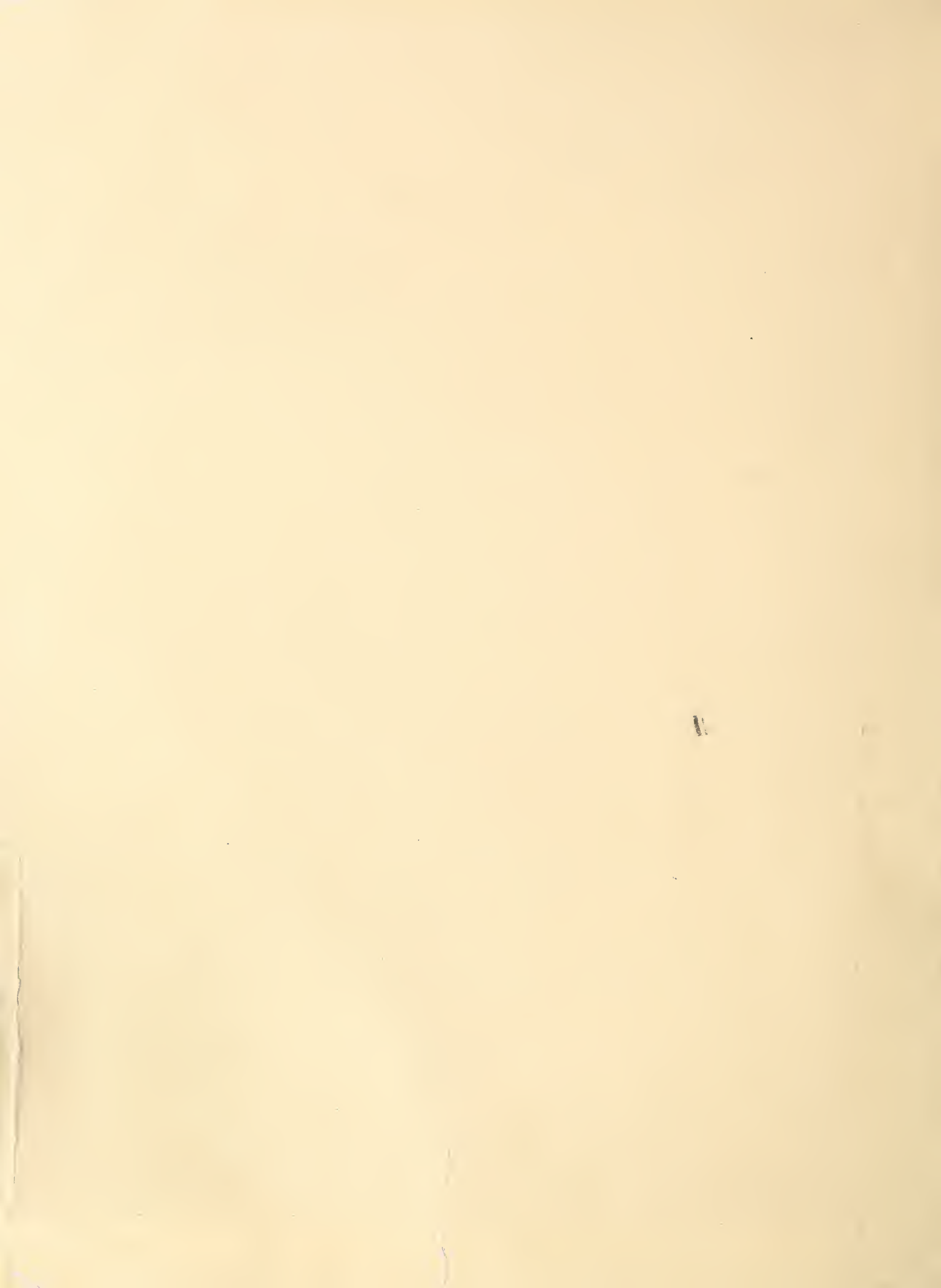


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August 1993



North Revilla Final Environmental Impact Statement

Ketchikan Pulp Company
Long-Term Timber Sale Contract
Volume II: Appendices A-J

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ACRONYMS AND SYMBOLS

ADF&G	Alaska Department of Fish and Game
AHMU	Aquatic Habitat Management Unit
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
ASQ	Allowable Sale Quantity
BBF	One billion board feet
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFL	Commercial Forest Land
CFR	Code of Federal Regulations
CZMA	Coastal Zone Management Act of 1976
DBH	Diameter at Breast Height
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EVC	Existing/Expected Visual Condition
FEIS	Final Environmental Impact Statement
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	Geographic Information System
IDT	Interdisciplinary Team
KPC	Ketchikan Pulp Company
KV	Knutsen-Vandenberg Act
LTF	Log Transfer Facility
LUD	Land Use Designation
LWD	Large Woody Debris (same as LOD)
MBF	One thousand board feet
MELP	Multi-Entry Layout Process
MIS	Management Indicator Species
MM	Maximum Modification
MMBF	One million board feet
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
P	Primitive
PR	Partial retention
R	Retention
RM	Roaded modified
RN	Roaded natural
ROD	Record of decision
ROS	Recreation Opportunity Spectrum
SHPO	State Historic Preservation Officer
SPM	Semi-primitive motorized
SPNM	Semi-primitive nonmotorized
TLMP	Tongass Land Management Plan
TRUCS	Tongass Resource Use Cooperative Survey
TTRA	Tongass Timber Reform Act
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFWS	United States Fish and Wildlife Service
VCU	Value Comparison Unit
VQO	Visual Quality Objective
WAA	Wildlife Analysis Area

Acknowledgements

Front cover: By Cindy Ross Barber, 1992. The design illustrates the range of interconnected issues addressed in the EIS.

Appendices

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Appendix A

Reasons for Scheduling the Environmental Analysis of the North Revilla Project Area

Reasons For Scheduling The Environmental Analysis Of The North Revilla Project Area

KPC Long-term Timber Sale Contract Offerings

This appendix explains why the North Revilla Project Area is scheduled for environmental analysis at this time.

Summary

Reasons for scheduling the North Revilla Project Area at this time, for detailed consideration of timber harvest under the Ketchikan Pulp Company Long-term Timber Sale Contract, may be summarized as follows:

1. The North Revilla Project Area is within the Contract Area Boundary of the "F" Allotment Primary area, for the Ketchikan Pulp Company Long-term Timber Sale Contract, and contains a sufficient amount of harvestable timber volume designated as LUD III or IV, and therefore appropriate for harvest under the Tongass National Forest Land Management Plan (TLMP). Available information indicates harvest of the amount of timber being considered for this project can occur consistent with Forest Plan Standards and Guidelines and other requirements for resource protection. Consideration of areas outside the designated sale area at this time would not meet Ketchikan Pulp Company Contract requirements and is otherwise not necessary or reasonable.
2. Other areas with available timber inside the designated sale area will be necessary for harvest within the remainder of the Ketchikan Pulp Company Contract term (by 2004) in order to meet contract volume requirements. Effects on subsistence resources are projected to differ little according to which sequence these areas are subjected to harvest. Harvesting other areas on the Tongass National Forest with available timber is expected to have similar potential effects on resources, including those used for subsistence because of widespread distribution of subsistence use and other factors. Harvest of these other areas is foreseeable, in any case, over the forest planning horizon under either the existing or proposed revised Forest Plan.
3. Providing substantially less timber volume than required by the Ketchikan Pulp Company Contract in order to avoid harvest in the North Revilla Project Area or other project areas would not meet contract requirements and is otherwise not necessary or reasonable.
4. It is reasonable to schedule harvest in the North Revilla Project Area at present rather than other areas in terms of previous harvest entry and access, level of controversy over subsistence and other effects, and the ability to complete the National Environmental Policy Act (NEPA) process and make timber available to meet contract requirements by the time it is reasonably necessary to do so. Other areas that are reasonable to consider for harvest in the near future are the subject of other project EISs that are currently ongoing or scheduled to begin soon.
5. A 200 MMBF total offering is consistent with cumulative effects assessments of the TLMP Revision (SDEIS).

More detail regarding the scheduling of the environmental analysis for the North Revilla Project Area is presented in this appendix in three subsections:

Ketchikan Pulp Company Contract Requirements
Tongass Land Management Plan
Forest Plan Implementation

Ketchikan Pulp Company Contract Requirements

Contract Background

In 1951, the Forest Service and Ketchikan Pulp Company (APC) entered into a contract for sale and harvest of timber in Southeast Alaska for a 50-year period beginning in 1954 and ending in 2004. A primary function of this long-term contract was to "establish a new industrial enterprise which will be an important and significant step in the industrial development of Alaska" (Forest Service 1956).

The current management situation consists of a valid contract between the Forest Service and KPC, contract number A10fs-1042. This contract bestows rights and obligations on both parties. One obligation for the Forest Service is to provide the agreed upon volume from an identified contract sale area on the Tongass National Forest. Contract section B0.62 states in part "Forest Service shall seek to specify sufficient Offerings to maintain a Current Timber Supply in all Offering Areas that total at least three years of operations hereunder or until the contract termination date, whichever comes first, and which meets the the production requirements of Purchaser's manufacturing facilities." This three year supply equates to approximately 615 million board feet.

"Current Timber Supply" is defined in the contract generally as timber which the Forest Service has specified according to Forest Service planning procedures and for which the NEPA process has been completed. The Forest Service specifies timber through approving in writing a timber "Offering" under the contract, comparable to an independent timber sale. This approval in writing is represented by issuance of an "A Division" contract document for the Offering. An EIS such as the North Revilla Project Area EIS may cover one or up to several such Offerings, which may be specified by the Forest Service and therefore added to the contract "Current Timber Supply" concurrently or sequentially after issuance of the Record of Decision for the Project. Generally, layout on the ground of roads and harvest units selected in the Record of Decision (ROD) will be completed for each Offering prior to issuance of the "A Division" approval document.

The Forest Service Timber Sale Preparation Handbook (FSH 2409.18 Chapter 10) details the process utilized to prepare timber sales. This process also guides the preparation of timber Offerings under the KPC Contract. The timber sale preparation process is summarized below. Included in brackets is information describing modifications to the process specific to the KPC Contract. The Handbook states:

The timber sale preparation process begins with the identification of the sale area and ends with the award of the timber sale contract [as described above, the process for the KPC Contract ends with the issuance of an "A Division" contract document for the Offering]. These activities pass through specific stages, called "gates", each of which requires specific outputs before proceeding to the next gate. . . . Following are descriptions of work processes at each gate.

Gate 1. Begin sale preparation activities with scoping or position statement development. Identify the purpose and need for the project, public issues, interested outside parties, management issues, resource opportunities in the sale area, a range of possible volume targets, and initial transportation system needs. . .

Gate 2. During the sale area design (environmental analysis) phase, develop alternative designs and analyze them for environmental effects. Concurrently, develop an analysis file to store the information that is gathered. Once a course of action is selected, develop a sale implementation plan that provides detailed instructions for field layout of all sale elements. The end product of the sale area design phase is the selection of the preferred alternative and signature of the decision notice by the official authorized to approve the project. . .

Gate 3. Activities leading to sale plan implementation include the data gathering and the on-the-ground marking, designating, and delineating needed to properly support the appraisal, the preparation of the contract, and post-award sale administration efforts. The sale passes through gate 3 when the field work is completed. . .

Gate 4. After gathering all necessary engineering design work, cruise (volume) information, logging costs, environmental protection costs, and other elements of the timber appraisal. . . [a final timber appraisal is prepared for the offering(s) and an "A Division" contract document is issued].

Contract provisions require KPC to harvest timber, construct and operate a mill for primary manufacture and to recruit labor from residents of Southeast Alaska. To fulfill this obligation KPC operates a sawmill and a pulp mill in Ketchikan and a sawmill in Metlakatla.

Why Areas Outside The Primary Sale Area Boundary Are Not Considered In Detail

Since authorization of the KPC contract in 1951, several laws have changed the land base from which the authorized timber volume could be removed. The Alaska Native Claims Settlement Act (ANCSA) authorized substitution to replace areas selected by the Native Companies. The Alaska National Interest Lands Conservation Act (ANILCA) authorized substitution for areas designated by Congress as Wilderness in that statute which were in the primary sale area. The substitutions for Native selections and Wilderness selections were accomplished prior to the North Revilla Project Area environmental analysis process.

Section B0.3 of the contract, *Description of Timber*, states in part:

The Ketchikan Pulp & Paper Company . . . ,hereby agrees to purchase from an area definitely designated on the attached maps which are part of this agreement, within pulptimber Allotments E, F, and G. . . The estimated amount to be cut under the methods of marking described in B2.3 is 1,500,000,000 cubic feet of western hemlock, Sitka spruce, western redcedar, Alaska cedar, and other species of timber, more or less.

Section B0.31 of the contract, *Additional Areas*, states in part:

In the event the quantity of timber available for cutting within the above described area is insufficient for full scale operation until June 30, 2004 . . . the Regional Forester shall designate additional cutting areas within Pulptimber Allotments E, F,

and G to meet such needs of such plants for the period ending June 30, 2004, provided, that the Regional Forester is not obligated to make available for cutting more than the 1,500,000,000 cubic feet of material covered by this agreement. . .

Section B0.61 of the Contract, *Timber Offering Schedule*, provides in part:

"To the extent authorized by law, Offering Areas may be identified for harvest outside the sale area, as needed to meet sale volume requirements."

The North Revilla Project Area lies within the "primary sale area" in Allotments E and G described in contract section B0.3. Current data indicates that there remains sufficient timber available within the designated sale area, including the additional areas described in Contract section B0.31 above, to provide the remaining unharvested portion of the total contract volume of 1,500,000,000 cubic feet, consistent with Forest Plan Standards and Guidelines and other requirements for environmental protection. The most recent Supplement to the Draft EIS for the Tongass Land Management Revision (TLMP SDEIS), which considers reductions in timber base due to the Tongass Timber Reform Act (TTRA), indicates this for the "current direction" alternative. For the current preferred alternative for the TLMP revision, the TLMP SDEIS indicates that there is at present easily enough available volume within the primary designated sale area to meet contract volume requirements for the next several years at least, while still meeting all constraints associated with the alternative. At some point in the future however, volume will also be required from the contingency areas to fulfill the contract volume requirements. This evaluation is incorporated by reference and further described in the last section in this Appendix, *Forest Plan Implementation*.

Therefore, providing volume outside of the primary sale area is not necessary at this time under the terms of the contract. Modifying the contract does not meet the purpose and need for the project. Although KPC has indicated that the Forest Service has the discretion to consider obtaining volume from outside the designated sale area, it has not expressed an interest obtaining timber from other areas in lieu of the North Revilla Project Area. The criteria for modification in 36 CFR 223.112,113 have not been met, considering the information in the TLMP SDEIS, and this EIS. Congress in enacting the Tongass Timber Reform Act declined to modify the contract sale area, and by directing in section 301(e) of the statute that the Secretary of Agriculture report to Congress on the effects of eliminating the sale area, indicated an intent to reserve this decision to the legislature.

Why Providing Less Than The Contract Volume Was Not Considered In Detail

Congress in section 301(e) of the TTRA also indicated its intent to reserve to itself the question of providing less than the contract volume obligation to KPC. Providing less than the contract volume would not meet the purpose and need for the North Revilla Project. The Forest Service can expect a large monetary claim from KPC for not meeting contract volume obligations, for which there is no current funding. To the contrary, recent federal appropriations legislation has dedicated additional money to providing additional timber offerings to KPC and other Tongass National Forest timber purchasers. Volume from independent timber sales or sources outside the Tongass National Forest do not fulfill KPC Contract requirements. In any case, there is not sufficient projected volume from other sources to meet KPC volume requirements.

Logs from Native Corporation lands cannot substantially meet the total needs of KPC. Owners of private timberland are able to sell their sawlogs on the export market for much higher prices than can be paid by local manufacturing. KPC is not prohibited under the Contract from purchasing timber from Native Corporations or other sources, subject to

the requirement that, ". . . at least three-fourths of the pulpwood requirements of the pulp manufacturing plant and other processing facilities operated in conjunction with this sale shall be cut from the areas covered by this agreement during the period prior to July 1, 1964, and during each 5-year operating period subsequent to that date." (KPC contract B0.53). There are no provisions in the Contract to offset such purchases by adjusting the Contract timber volume. Harvest from Native Corporation lands is decreasing, reducing potential pulp as well as sawlog availability from these lands (TLMP SDEIS page 3-339).

Canadian timber has been mentioned in the past as a source of supply for Southeast mills. Southeast Alaska pulp mills have purchased pulp logs from British Columbia (BC) in the past. However, the political and economic situation in British Columbia has changed to decrease the likelihood of substantial supply from this source. The June 1988 issue of British Columbia Lumberman, page W14, states that a substantial increase in demand for BC forest products is expected to decrease log exports. The Forest Minister stated: "Our main objective is to use BC timber to manufacture wood products in this province." It has been more recently stated that British Columbia is considering prohibiting log exports and is facing increased environmental pressures (TLMP SDEIS, page 3-339).

Trying to meet the long-term volume contractual obligations from outside the long-term timber sale boundaries would decrease the availability of timber for the independent timber sale program, including the Small Business Set Aside Program; obtaining a substantial portion of long-term contract timber from outside the designated sale areas would probably decrease the independent sale program by an equivalent amount under the current TLMP allowable sale quantity. Under the current Plan, an annual average of 271 MMBF net sawlog of the ASQ is needed to meet the long-term sale requirements, leaving an annual average of 179 MMBF net sawlog for the independent program.

The TLMP SDEIS (table 3-134, page 3-368) shows for the current Plan as amended by the TTRA (Alternative C) the contribution to ASQ net sawlog (MMBF) by Allotment Area. Contingency Areas of Allotment E, F, and G of the KPC contract area contribute 125 MMBF annual average (28%) to the ASQ. Designating any part of this volume for the long-term sale would directly reduce the portion of the ASQ available for the independent program. The timber volume included in the action alternatives in the North Revilla Project Area EIS and scheduled from this area in the TLMP for the long-term contract is greater than the current yearly size of the entire Small Business Administration timber sale program agreed to with the SBA, 80 MMBF. Section 105 of the Tongass Timber Reform Act reflects Congressional intent that the SBA program continue.

Lack of an adequate timber supply to support these programs could affect the existing mill infrastructures and employment. The TLMP SDEIS (table 3-118, page 3-337) shows that lumber mill capacity for independent operators is about 220 MMBF annually (380 MMBF minus the Wrangell and KPC Sawmills). During good market conditions, the short term sales program has purchased up to 174 MMBF and harvested up to 149 MMBF annually which translates into about 67 percent of the mill capacity (TLMP SDEIS, table 3-114, page 3-325). Therefore, under good market conditions, the existing infrastructure can absorb the available supply. Elimination of short term sales under the independent and set-aside programs would translate into a loss of between 815 and 1144 timber-related jobs (TLMP SDEIS page 3-370, 3-610).

Current Timber Supply And Contract Volume Needs

This section provides an updated look at the long-term contract timber volume projected to be available to KPC. It includes a tentative schedule projecting how volume is to be made available to meet contract obligations which states; "Forest Service shall seek to to

specify sufficient Offerings to maintain a Current Timber Supply in all Offering Areas that totals at least three years of operations hereunder or until contract termination date, whichever comes first, and which meets the production requirements of the Purchaser's manufacturing facilities." (Contract Section B0.62).

Generally, there is a need for approximately 2,500 million board feet of timber volume remaining over the life of the KPC contract. This equates to an average of approximately 205 million board feet per year. Table 1 shows the volume available as of January 1, 1992 and displays how timber volume would be scheduled through 2004 to help meet current timber supply needs.

Table 1
Current Timber Supply and Projected Harvest to 2004.¹
(MMBF/YEAR)

Year	93	94	95	96	97	98	99	00	01	02	03	04
NEPA COMPLETED												
89-94	120											
Frosty	33											
Starfish	45											
12 Mile	12											
Shelter Cove	17											
NEPA REQUIRED												
CPOW	290											
North Revilla	200											
Polk Inlet	125											
Lab Bay		85										
Control Lake		187										
Upper Carroll		130										
Heceta			75									
Sea Level			67									
Three Creeks			49									
Vixen Inlet				175								
Port Stewart				135								

Year	93	94	95	96	97	98	99	00	01	02	03	04
Chasina					166							
Tuxekan					59							
Ratz					40							
North POW						103						
Moir						119						
South POW							80					
Honker							119					
Luck Lake								107				
Lower Carroll								41				
Chomondeley								75				
NEPA Cleared Volume	615	402	191	310	265	222	199	223				
Initial Wood Supply	230	640	837	823	928	988	1005	999	1017	812	607	402
Projected Harvest	205	205	205	205	205	205	205	205	205	205	205	205
Ending Wood Supply	640	837	823	928	988	1005	999	1017	812	607	402	197

Note: Approximately 197 MMBF of the above figures is anticipated to be included in the Ketchikan Area's independent sale program. Numbers shown in parentheses indicate EISs in progress.

¹ All volume figures shown include sawlog and utility volume and are in MMBF.

The North Revilla Project Area EIS offers volume to help meet KPC contract obligations starting in 1994. This amount of volume is reasonably necessary to help maintain a three year Current Timber Supply of at least 615 million board feet of timber. Based on the scenario shown in table 1, operations in North Revilla Project Area could begin in 1994 with all operations substantially complete by 1998.

Tongass Land Management Plan

TLMP As Amended Winter 1985-86

Chapter 1 of this EIS includes an explanation of how this project relates to the Tongass Land Management Plan. That section describes the Land Use Designations (LUDs) which allocate land areas to different types of management. Chapter 1 also explains that these LUDs were assigned to land areas known as Value Comparison Units (VCUs), and that one or more contiguous VCUs were formed into Management Areas (MAs). This section also describes the management emphasis for the Management Areas likely to be affected by the North Revilla Project.

The Tongass Land Management Plan, As Amended Winter 1985-1986, not only detailed Management Direction/Emphasis for each Management Area, it also scheduled specific Management Activities for specific time periods. In particular it scheduled timber sale preparation activities for 1985-89 and 1990-94. Table 2 displays the Management Areas scheduled for timber sale preparation during 1990-94.

Table 2
TLMP, As Amended Winter 1985-86, Activity Schedule

Management Area	Name	Years Scheduled	Activity Scheduled
K03	El Cap/Whale Pass	90-94	Timber Sale Prep
K07	Tuxekan Narrows	90-94	Timber Sale Prep
K08	Honker/Sweetwater	90-94	Timber Sale Prep
K09	Clarence Strait	90-94	Timber Sale Prep
K10	Thorne Bay	90-94	Timber Sale Prep

The Allowable Sale Quantity (ASQ), calculated in TLMP and used in Congressional deliberations and decisions on ANILCA, assumed harvest in all LUD III and LUD IV VCUs, in compliance with the Southeast Area Guide, on a three entry, 100 year rotation. Some selected areas were scheduled for 4 entries in 120 years (LUD IV) and 6 entries in 200 years (LUD III) for visual considerations. A three entry rotation assumes the first entry will be made within 30 to 40 years. If areas are not entered, and the ASQ is harvested, other areas will have to receive a heavier entry, resulting in a pattern of high percentage first entries being established, and therefore creating conditions under which the three-entry rotation may not be achievable.

The TLMP as amended also scheduled as anticipated management outputs from the Ketchikan Area timber volume ranging from 195.0 million to 220.3 million annually (Tongass Land Management Plan Amended Winter 1985-86, page 5).

Supplemental TLMP Revision Draft EIS (TLMP SDEIS)

1. Sufficient Volume for KPC Contract Needs in TLMP SDEIS.

The TLMP SDEIS Chapter 3 section on timber (pages 3-354 and 355) provides the following summary statements in terms of the timber supply and the long-term timber sale programs.

If utility volume is included, Alternatives B, C, D, and P would meet or exceed the projected demand for National Forest timber (400 MMBF). Alternative A would provide 89 percent of the projected demand.

All (100 percent) of the first-decade Allowable Sale Quantity (ASQ, sawlog) in Alternative A would be needed to satisfy the long-term contracts; Alternative B would need 82 percent of the ASQ; Alternative C, 69 percent; Alternative D, 66 percent; and Alternative P, 75 percent.

These statements show that timber supply exceeds the level which is required to satisfy the long-term timber sale contracts (both APC and KPC). The data to support these statements is displayed in table 3-127 on page 3-355 and table 3-135 on page 3-371 of TLMP SDEIS. Table 3-135, in particular, shows the Long-Term and Short-Term Sales program volumes for the decade.

TLMP SDEIS also presents a discussion of timber supply within the KPC long-term contract sale area. As of October 1990 (the date of the TLMP SDEIS analysis), the remaining KPC Long-term Timber Sale Contract volume requirement was 2,443 MMBF, including utility (TLMP SDEIS , table 3-116, page 3-329, table 3-133, page 3-366). TLMP SDEIS alternatives A, B, C, D, and P provide, respectively, 3,800 MMBF, 4,180 MMBF, 5,930 MMBF, 5,920 MMBF and 5,480 MMBF, including utility, from the KPC designated sale area (allotments E, F, and G (TLMP SDEIS, table 3-133, page 3-366). So the all alternatives in the TLMP SDEIS indicates more than sufficient timber remaining available in the designated KPC sale area to meet remaining contract volume requirements, consistent with resource protection requirements and other constraints projected in the document.

Further analysis in TLMP SDEIS is related to suitable-available acres. These are acres of forest that are identified as suitable for timber harvest and which are assigned management prescriptions within the TLMP SDEIS that allow consideration of timber harvest. For each alternative, TLMP SDEIS analysis confirms that the identified suitable-available acres contain more than enough potentially available timber within the sale area to meet the remaining volume commitment. These figures appear in table 3-134, pages 3-368 and 3-369, TLMP SDEIS and are summarized in the following table.

Table 3
Timber Volume Available Within The Contract Area

Alt.	Allotment Area	Suitable-Available (Acres)	Old Growth Standing Vol (MMBF)
A	E-Primary	141,194	2,098
	F-Primary	38,960	698
	G-Primary	101,493	1,499
	Rest of E	39,166	826
	Rest of F	129,743	2,891
	Rest of G	157,426	2,806
		-----	-----
		607,982	10,818
B	E-Primary	154,484	2,408
	F-Primary	42,193	793
	G-Primary	122,586	1,868
	Rest of E	45,926	984
	Rest of F	147,347	3,291
	Rest of G	153,245	2,678
		-----	-----
		665,781	12,022
C	E-Primary	169,584	2,772
	F-Primary	47,769	915
	G-Primary	139,423	2,223
	Rest of E	75,551	1,702
	Rest of F	234,232	5,367
	Rest of G	227,707	4,407
		-----	-----
		894,266	17,386
D	E-Primary	179,257	2,931
	F-Primary	49,889	939
	G-Primary	145,925	2,356
	Rest of E	47,065	1,010
	Rest of F	213,401	4,853
	Rest of G	240,790	4,676
		-----	-----
		876,327	16,765
P	E-Primary	161,578	2,586
	F-Primary	45,262	859
	G-Primary	135,737	1,401
	Rest of E	65,954	1,462
	Rest of F	217,768	4,981
	Rest of G	199,856	3,809
		-----	-----
		826,155	15,098

Furthermore, TLMP SDEIS displays the number of acres of tentatively suitable lands that are scheduled to be harvested over the planning horizon for each Management Area (TLMP SDEIS, table 3-138, page 3-378). This table indicates that the scheduling of the North Revilla Project Area and other project areas within the KPC sale area to meet contract volume requirements over the next several years is anticipated. In addition, this table shows that there are adequate suitable acres in these Management Areas, scheduled to be harvested, to provide that volume. A portion of table 3-138 is displayed below in table 4. It displays, for Alternative P, the scheduled suitable acres by Management Area. Table 4 is similar to table 2 which showed the Management Areas scheduled for timber sale preparation during 1991-95. A comparison of these two tables indicates that the Management Areas identified as appropriate for timber harvest activities in the existing TLMP (as amended winter 1985-86) are also identified as appropriate in alternative P of TLMP SDEIS.

Table 4
TLMP SDEIS Alternative P Scheduled Acres (selected Management Areas)

Mgmt. Area	Name	Acres Sched- uled	Percent Of MA	Total MA Acres
K03	El Capitan	50,923	46.8	108,805
K07	Tuxekan	74,553	63.0	118,310
K08	Honker	57,310	46.3	123,835
K09	Clarence	52,296	55.0	95,068
K10	Thorne Bay	19,694	40.9	48,194

2. Cumulative Effects

The TLMP SDEIS considers the cumulative effects for forest-wide acres managed for timber production for both the long-term and short-term timber sale programs. These effects are discussed on pages 3-371 through 3-381. Cumulative effects for other resources are discussed at the end of their respective sections.

Analysis points to the need to schedule harvest in VCUs assigned management prescriptions which permit consideration of timber harvest, including the VCUs within the North Revilla Project Area. These VCUs in the current Forest plan, and in the draft revised Forest Plan would be needed to help meet the Tongass National Forest Allowable Sale Quantity, and also the contractual timber volume needs for the KPC Long-term Timber Sale. The forest-wide cumulative effects analysis in the TLMP SDEIS supports the conclusion that this harvest can be accomplished within existing and proposed revised TLMP standards and guidelines and other requirements for resource protection.

3. Subsistence

With the passage of the ANILCA, Congress recognized the importance of subsistence resources to rural residents of Alaska. In particular, prior to any disposition of public lands, an agency must first complete a subsistence effects evaluation, including consideration of the availability of other lands (ANILCA 810 (a)).

Based on a review of available harvest volumes for each VCU in the KPC contract area, it appeared that in order to meet contract volume commitments, most of the LUD III and IV VCUs would need some level of harvest prior to the end of the KPC contract in 2004. A tentative offering schedule was developed and approved for implementation based on this analysis. In short, almost all LUD III and IV VCUs in the KPC Long-term Sale would be scheduled for harvest within the next 10 to 15 years, indicating a level of impact to all subsistence use areas. However, the most significant impacts on the subsistence resource habitat would not occur until 20 to 30 years after the timber harvest when the second growth canopy closes. When those impacts to subsistence resources are viewed from a reference point 20 years in the future, the particular importance of which areas are scheduled first during a 5-year period appears to be minor.

In considering communities that may be most affected by any proposed timber harvest in the North Revilla Project Area, Metlakatla, Meyers Chuck, Thorne Bay, Saxman, and Wrangell appear to have the strongest cultural and subsistence ties to the area. Each community has its own level of reliance on subsistence as well as its own level of reliance on the North Revilla Project Area for supplying subsistence resources. Information regarding subsistence use by these communities is provided in chapter 3 of the North Revilla Project EIS.

Extensive forest-wide cumulative effect analysis has been included in the TLMP SDEIS (TLMP SDEIS pages 3-628 through 3-765). That analysis, and the tables of data shown in appendix K of TLMP SDEIS are incorporated by reference into this document. The data in appendix K and L indicates subsistence hunting of deer and other uses in virtually every area of the Tongass with substantial quantities of harvestable timber. The following information is extracted directly out of the Tongass Land Management Plan Revision, Supplement to the Draft Environmental Impact Statement, pages 3-762 and 3-763:

In conducting the subsistence evaluation it is determined that, in combination with other past present and reasonably foreseeable future actions, none of the alternatives would pose a significant possibility of significant restriction for salmon, other finfish, marine mammals, invertebrates, plants, mountain goat, moose, waterfowl, sea birds, or other small game. Together these resources account for an average of 79 percent of the total harvest of subsistence resources (Kruse and Muth, 1990).

In considering the impacts of future actions that may take place under the proposed alternatives on deer, two types of analysis was conducted. Potential effects were first determined for those WAA's where residents have successfully harvested deer, then for those WAA's where residents have ever gone to harvest deer. Both 10 percent and 20 percent harvest levels of the deer population were used.

Considering only those WAA's where residents successfully harvested deer and assuming a harvest level of 10 percent of the population, there would be sufficient deer in all alternatives for the next 50 years to meet all subsistence needs for all communities except Gustavus, Hoonah, Kake, Pelican, Sitka, and Yakutat (appendix K). For these communities, there would be insufficient habitat capability to support harvest by all subsistence users (regardless of the community of origin). However, at 20 percent of the population, all subsistence needs for these communities would be met by all alternatives for the next 50 years (appendix K).

If instead of considering only those WAA's in which hunters were successful, we consider all WAA's ever hunted by community residents, then there would be sufficient deer habitat capability to support all subsistence hunters in the WAA's used for

hunting by all subsistence communities except for Pelican and Gustavus. If instead of assuming a 10 percent harvest level, a 20 percent harvest level is used, there would be sufficient habitat capability to support all subsistence harvest in all WAA's used for hunting by all subsistence communities.

As a result of the analysis of the impacts of projects that would be permissible under each of the alternatives considered for adoption in the Forest Plan, it has been determined that all of the alternatives, if all permissible projects were fully implemented, have the potential to impact subsistence uses of deer, black bear, and furbearers (specifically martens) due to potential effects of projects on abundance/distribution, and competition.

The analysis shown in chapter 3 of this EIS is supported by the analysis shown above in the TLMP SDEIS. The conclusion stated above, "it has been determined that all of the alternatives, if all of the permissible projects were fully implemented, have the potential to impact subsistence uses of deer. . .", supports the conclusion that any environmental analysis area within the Tongass would have a similar chance of having a significant possibility of a significant restriction on subsistence resources for Sitka Black-tailed deer, and other mammals.

The analysis for ANILCA section 810 are shown in the Subsistence section of chapter 3, in this EIS. The determinations made from the ANILCA section 810 analysis and findings are a part of the Record of Decision for this project and were developed in conjunction with the Final EIS.

Forest Plan Implementation

Review of Available Volume

A review was conducted of each VCU within the designated sale area for available volume. This analysis was based on computer inventories and Allowable Sale Quantity (ASQ) calculations from TLMP Draft Revision (1991a).

The review used the following guidelines to identify likely areas to schedule for environmental analysis in the near future:

- (1) Evaluate by area the total available volume within the designated sale area. Between 1991 and 1993, there is a need to identify a potential harvest of 700 MMBF.
- (2) Identify a tentative operating schedule which addresses volume to be offered from the Ketchikan Area.
- (3) Prepare a schedule of environmental analysis areas which shows how the Ketchikan Area will meet the tentative operating schedule from 1991 through the end of the contract. This schedule must provide a minimum of 615 MMBF 'current timber supply' through the end of the contract.

The results of the first step by the working group analysis are presented in table 5. The results of this volume review, further supported by TLMP revision information, provided the basis for scheduling the next series of environmental analyses.

Table 5
Available Volume By VCU In The KPC Contract Boundary (9/89).

Project Area	MAs in Analysis Area	(MMBF)
AA I Cental Prince of Wales		
North Revilla	K03 (Portion), K07, K08, K09, K10	291
Ratz (2nd Entry)	K09 (Portion)	40
Honker (2nd Entry)	K08 (Portion)	119
Luck Lake (2nd Entry)	K08 (Portion), K09 (Portion)	107
Tuxekan (2nd Entry)	K07	59
AA 2 - Lab Bay		
Lab Bay	K01, K03 (Portion)	85
North POW (2nd Entry)	K01, K03 (Portion)	103
AA 3 - Polk Inlet		
Polk Inlet	K17, K18	125
Chomondeley (2nd Entry)	K18, K19	75
AA 4 - North Revilla		
North Revilla	K32 (Portion)	200
AA 6 - Sea Level		
Sea Level	K35	67
AA 7 - Control Lake		
Control Lake	K05, K08	187
AA 8 - Upper Carroll		
Upper Carroll	K32 (Portion)	130
AA 9 - Three Creeks		
Three Creeks	K39	49
AA 10 - Vixen Inlet		
Vixen Inlet	K29	175
AA 11 - Port Stewart		
Port Stewart	K30	135
AA 12 - Lower Carroll		
Lower Carroll	K34, K35	41
AA 13 - South POW		
South Pow	K28	80
AA 14 - Heceta		
Heceta	K11	75
AA 15 - Chasina		
Chasina	K24	166
AA 16 - Moira		
Moira	K25	119

Analysis Area Reviews

For each area identified as having sufficient volume available to consider for further environmental analysis at this time, a review was conducted to decide which areas to schedule first, considering the current TLMP and proposed revised TLMP schedule, and other factors described below. The results of this review and supporting reasons for each area appear below:

Central Prince of Wales - This project area is located within TLMP management areas K03, K07, K08, K09 and K10. The area has had extensive harvesting in the past. No additional log transfer facilities (LTF's) are required to harvest timber in this area. The majority of the road system is already in place, only limited additional road construction would be required. The area is entirely within the primary sale area. This area was given the highest priority due to its location within primary sale area, ease of access, prior harvest and no additional LTF construction.

Polk Inlet - This project area is located within TLMP management area K17 and K18. The K17 portion of the area is located within the primary sale area. The area has had extensive harvesting in the past. Roads have been developed previously into the area but construction is difficult due to the terrain. A logging system transportation analysis was completed for the area as part of the 1989-1994 EIS. Three LTF's will be required enter the area but they have already been approved for construction under the 1989-1994 EIS and their required permits have been acquired or in process. The area was given a high priority since it has a large portion located within primary sale area, has had previous harvest, and has had prior road development. The area was not given highest priority due to LTF construction and difficult access.

North Revilla - This project area is located within TLMP management area K32. The area has had extensive harvesting in the past. It is located within the primary sale. A large amount of new road construction will be needed in the area. Road construction into the area is difficult due to steep terrain and unstable slopes. Nine LTFs will be required to access the area, of which three will require new construction. The area was given high priority since it is located within the primary sale area, has had prior harvest and road construction, and a logging system transportation analysis had already been completed for the area. It was not given highest priority due the requirement of three new LTFs and difficult road construction.

LAB Bay - This project area is located within TLMP management area K01 and K03. The area has had extensive harvesting in the past. One additional LTF will be required, other timber will utilize two existing LTF's. The vast majority of timber will have to pass through these two existing LTFs. The limited number of additional LTF's in the area could create a bottle neck getting wood from the field into the water. The area was given a high priority since it is in the primary sale area, has current road access, and has had previous harvest. It was not given highest priority due to a limited number of LTF's to put logs into the water.

Sea Level - This project area is located within TLMP management area K35. The area has had limited harvesting in the past. The area is within the KPC long term contract, however it is outside primary sale area boundary. Road construction is difficult in the area but no new LTF's are required to access the timber. This area was given a moderate priority for scheduling due to being within the timber sale contract and not requiring any new LTF's.

Control Lake - This project area is located within TLMP management area K08 and K05. The area has had extensive harvesting in the past. No additional log transfer facilities (LTF's) are required in to harvest timber in this area. The majority of the road system is already in place, only limited additional road construction would be required. The area is within the long-term contract area, but not within the primary sale area portion. This area was given a moderate priority since it had ease of access, prior harvest and no additional LTF construction but was not within the primary sale area.

Heceta - This project area is located within TLMP management area K11. The area has had extensive harvesting in the past. The area is within the KPC long term contract, however

it is outside primary sale area boundary. Remaining volume available for harvest in the area is low. The project area is a small island off the west coast of Prince of Wales Island and faces the open ocean. This makes the logistics associated with timber harvest activities difficult. This area was given a moderate priority for scheduling due not being in the primary sale area, low potential volume, and difficult logistic problems.

Upper Carroll - This project area is located within TLMP management area K32. The area has had limited harvesting in the past. The area is within the KPC long term contract, however it is outside primary sale area boundary. Road access in the area is difficult. One new LTF will be required. Road construction associated with this project may help complete the linkage for the transportation utility corridor planned for the area. This area was given a moderate priority for scheduling despite the potential transportation utility corridor due difficult access and not being in the primary sale area.

Three Creeks - This project area is located within TLMP management area K39. The area has had limited harvesting in the past. The area is immediately behind the community of Ketchikan and as is heavily used for recreation. The area is within the KPC long term contract, however it is outside primary sale area boundary. This area was given a moderate priority for scheduling despite good timber harvest economics due to low potential volume and high recreation values.

Vixen Inlet - This project area is located within TLMP management area K29. The area has had limited harvesting in the past. There is potentially a large amount of volume available in the area, although it is somewhat scattered. This will require a high ratio of miles of road construction per MBF of timber harvest. The area is within the KPC long term contract, however it is outside primary sale area boundary. The project is on Cleveland Peninsula which has important wildlife and recreation values. There is currently no road access into the area. There are no existing LTF's and one new LTF would be required. This area was given a moderate priority for scheduling due the large amount of potential volume and since it is within the long term sale boundary. It was not given a high priority since it is not within the primary sale area and has high recreation and wildlife values.

Port Stewart - This project area is located within TLMP management area K30. The area has had limited harvesting in the past. There is potentially a large amount of volume available in the area, although it is somewhat scattered. This will require a high ratio of miles of road construction per MBF of timber harvest. The area is within the KPC long term contract, however it is outside primary sale area boundary. The project is on Cleveland Peninsula which has important wildlife and recreation values. There is currently no road access into the area. There are no existing LTF's and one new LTF would be required. This area was given a moderate priority for scheduling due the large amount of potential volume and since it is within the long term sale boundary. It was not given a high priority since it is not within the primary sale area and has high recreation and wildlife values.

Lower Carroll - This project area is located within TLMP management area K34 and K35. The area has had limited harvesting in the past. The area is within the KPC long term contract, however it is outside primary sale area boundary. The area was recently analyzed as part of the Shelter Cove EIS. As part of that EIS a logging system transportation analysis was developed for the area. Remaining volume potentially available for harvest from this area is low. This area was given a low priority for scheduling due to not being in the primary sale area, low amount of potential volume, and having been recently analyzed as part of another EIS.

South POW - This project area is located within TLMP management area K28. The area has had extensive harvesting in the past. The area is within the KPC long term contract,

however it is outside primary sale area boundary. There is no existing logging system transportation analysis available for the area. The area would require the construction of three new LTF's. Road construction in the area would be very difficult. The quality and quantity of timber in the area is not very high. The result is that timber harvest in the area is likely to be economically marginal. As a result of these factors, this area was given a low priority for scheduling.

Results of Analysis

Upon completion of the above analysis, four Project Areas were identified and scheduled for environmental analysis. The four timber projects were initiated which had a high priority and were within the KPC "Primary Sale Area". The KPC contract provides direction to seek to find timber supplies within the Primary Sale Area before seeking volume within contingency areas. These four projects were needed to produce sufficient volume to provide KPC with 205 MMBF for the 1993 logging season, as well as to provide a three-year timber supply of 615 MMBF. There WAS expected to be 120 MMBF of timber volume remaining from previous projects which will be available to KPC by the beginning of the 1993 operating season. Therefore, these four timber projects need to produce a total of 700 MMBF, which, when combined with the 120 MMBF currently available, will provide volume for the 1993 logging season, plus a three-year timber supply.

This 700 MMBF was divided among the four timber projects based on the size of the project areas, as well as on their relative abilities to produce timber volume in an expedient fashion. Other factors considered in making this volume determination for the project included: (1) this harvest level is consistent with the sale schedule in the TLMP (1979a, as amended); (2) sufficient volume has been determined to be available in the Project Area; (3) there is an extensive road network in place; (4) the number and location of Log Transfer Facilities (LTF's) is sufficient to handle this volume of timber within a three-year time frame; (5) there are existing KPC-operated logging camps within the area to handle this volume; and (6) the current Forest Plan (TLMP 1979a, as amended) calls for harvest in this Project Area.

When these four projects were initiated there was expected to be approximately 120 MMBF of timber volume remaining from a previous NEPA project (1989-94 LTS EIS) which would be available to KPC by the time the North Revilla Final EIS is released. However, once these four projects were underway, delays were experienced in their completion. These delays were such that only limited volume could be made available from them for the 1993 logging season. This also had an effect of delaying when a 3 year timber supply could be achieved. In an effort to provide enough volume for the 1993 logging season, and to stay on schedule for attaining a three year timber supply, four independent sales were released to KPC. These sales total 107 MMBF and include: 12-Mile (12 MMBF), Frosty (33 MMBF), Shelter Cove (17 MMBF), and Starfish (45 MMBF). Frosty and Starfish are located on the Wrangell District of the Stikine Area.

Subsequently, a schedule of additional project level environmental analysis was identified for fiscal years 1993 through 2000 to complete the Long-term Sale. This schedule has been reviewed and reaffirmed and is shown in the following memo.



United States
Department of
Agriculture

Forest
Service

Region 10

Tongass National Forest
Ketchikan Area
Federal Building
Ketchikan, AK 99901

Reply To: 1950

Date: April 26, 1993


Subject: Timber Sale NEPA Documents

To: Forest Supervisor

The following schedule of NEPA documents represents the proposed NEPA analysis needed to fulfill the timber sale action plan. This memo is intended to update the October 10, 1992 sale schedule memo.

KETCHIKAN AREA DRAFT SALE SCHEDULE
NEPA DOCUMENT SUMMARY

Project Name	Begin Project (Gate 1)	Issue NOI (Gate 2)	Issue DEIS (Gate 2)	Issue FEIS (Gate 3)	Projected Volume
CPOW				7/93	290
North Revilla				7/93	200
Polk Inlet			6/93	9/93	125
Lab Bay			10/93	4/94	85
Control Lake	3/93	7/93	5/94	11/94	187
Upper Carrol	3/93	7/93	5/94	11/94	130
Heceta	3/93	7/94	5/95	11/95	75
Sea Level	3/93	7/94	5/95	11/95	67
Three Creeks	3/93	7/94	5/95	11/95	49
Vixen Inlet	5/93	7/95	5/96	11/96	175
Port Stewart	5/93	7/95	5/96	11/96	135
Chasina	3/96	7/96	5/97	11/97	166
Tuxekan	3/96	7/96	5/97	11/97	59
Ratz	3/96	7/96	5/97	11/97	40
North POW	3/97	7/97	5/98	11/98	103
Moirra	3/97	7/97	5/98	11/98	119
South Pow	3/98	7/98	5/99	11/99	80
Honker	3/98	7/98	5/99	11/99	119
Luck Lake	3/99	7/99	5/00	11/00	107
Lower Carrol	3/99	7/99	5/00	11/00	41
Chomondeley	3/99	7/99	5/98	11/00	75


 DAVID ARRASMITH
UASDT Planning Staff Officer

FS-8200-28(7-82)

Comments recieved on the Draft Environmental Impact Statement expressed a concern regarding the sustainability of the timber harvest levels. The concern was made for the Ketchikan Area as whole, as well as the distribution of the harvesting within the Area. To address these concerns additional analysis was performed to estimate Ketchikan Area wide timber harvest levels over the next 50 years by Management Area. This analysis was done by Management Area to give a spatial indication of where the harvests would occur. It was done for 50 years since this is the estimated period until the second growth produced by earlier cutting would become available for harvest once again. The analysis was done using the suitable land base identifeid in Alternative P in the TLMP Revision as the best indicator of future land allocations affecting lands available for harvest. This analysis also assumes that; 1) price increases for wood products will occur resulting in making economically marginal lands possible to harvest, and 2) there will be no further reductions in the suitable land base due to legislation, Forest Planning, or other factors. The results of this analysis are displayed below in both millions of board feet per decade (MMBF/Decade) and millions of cubic feet per decade (MMCF). The analysis indicates that although timber harvest levels can be sustained Ketchikan Area wide, there will be some shifts through time as to where that harvest incurs.

Table 6
Distribution of Ketchikan Area's Timber Harvest Over the Next 50 Years
(MMBF/Decade & MMCF/Decade)

MANGEMENT AREA	1995-2004	2005-2014	YEARS 2015-2024	2025-2034	2035-2044
K01 Sumner	85/ 20	151/ 33	82/ 20	141/ 33	154/ 36
K03 El Capitan-Whale Pass	142/ 33	97/ 22	144/ 37	168/ 40	33/ 8
K04 Kosciusco East	0/ 0	47/ 10	63/ 15	35/ 8	28/ 7
K05 Kosciusco West	0/ 0	246/ 56	125/ 29	27/ 6	53/ 12
K07 Tuxekan Narrows	190/ 44	212/ 46	305/ 74	258/ 61	112/ 29
K08 Honker Sweetwater	331/ 77	127/ 28	97/ 24	233/ 54	237/ 60
K09 Clarence Strait	145/ 34	78/ 17	179/ 44	213/ 50	105/ 28
K10 Thorne Bay	30/ 7	56/ 13	90/ 23	61/ 15	33/ 8
K11 Heceta	75/ 17	236/ 54	91/ 23	49/ 11	28/ 7
K14 Craig	0/ 0	124/ 28	98/ 23	283/ 67	231/ 63
K15 Control	67/ 16	78/ 17	28/ 7	146/ 34	54/ 13
SUBTOTAL Thorne Bay R.D.	1065/248	1452/324	1302/319	1614/379	1068/271
K17 Hollis	20/ 5	45/ 11	36/ 9	131/ 31	129/ 32
K18 Scowl - W. Cholmondeley	155/ 36	212/ 46	142/ 32	50/ 11	168/ 46
K19 Spiral - Clover	25/ 6	13/ 3	0/ 0	3/ 1	46/ 13
K20 Sumez	0/ 0	39/ 9	5/ 1	83/ 19	30/ 7
K21 Sukkwan	0/ 0	18/ 4	33/ 8	229/ 52	199/ 52
K22 Dall Island	0/ 0	10/ 2	12/ 3	37/ 9	59/ 15
K24 Cholmondeley Sound	166/ 38	126/ 29	26/ 6	45/ 9	2/ -
K25 Moria	119/ 27	185/ 46	26/ 6	40/ 9	29/ 8
K28 Kegan	80/ 19	49/ 13	5/ 1	5/ 1	0/ 0
SUBTOTAL Craig R.D.	565/131	697/163	285/ 66	623/142	662/173

MANGEMENT AREA	1995-2004	2005-2014	YEARS 2015-2024	2025-2034	2035-2044
K29 North Cleveland	175/ 43	6/ 2	169/ 40	23/ 5	16/ 4
K30 South Cleveland	135/ 33	15/ 3	180/ 43	49/ 11	31/ 7
K32 West Revilla	330/ 78	83/ 19	85/ 23	66/ 16	287/ 68
K34 Swan Lake	0/ 0	4/ 1	9/ 2	0/ 0	0/ 0
K35 Carrolll - Thorne	75/ 18	102/ 24	275/ 66	28/ 7	116/ 27
K39 George Inlet	82/ 19	137/ 32	42/ 10	20/ 4	45/ 11
SUBTOTAL Ketchikan R.D.	797/191	347/ 81	760/184	186/ 43	495/117
K44 Hyder	0/ 0	1/ -	9/ 2	15/ 4	20/ 5
SUBTOTAL Misty Fiords	0/ 0	1/ -	9/ 2	15/ 4	20/ 5
GRAND TOTAL Ketchikan Area*	2427/569	2495/569	2354/569	2437/569	2246/569

* May not sum to total due to rounding.

Appendix B

Units Greater than 100 Acres

Appendix B
Harvest Units Over 100 Acres in Size
By Alternative

NFMA regulations provide that 100 acres is the maximum size of created openings to be allowed for the hemlock-Sitka spruce forest type of coastal Alaska, unless excepted under specific conditions. The Alaska Regional Guide (page 3-20) provides---

Recognizing that harvest units must be designed to accomplish management goals, created openings may be larger where larger units will produce a more desirable contribution of benefits. Factors to be considered to determine when a larger size may be permitted are:

1. Topography
2. Relationship of units to other natural or artificial openings and proximity of units
3. Coordination and consistency with adjacent management areas
4. Effect on water quality and quantity
5. Visual absorption capacity
6. Effect on wildlife and fish habitat
7. Regeneration requirements for desirable tree species, based upon latest research
8. Transportation and harvesting system requirements
9. Natural and biological hazards to the survival of residual trees and surrounding stands
10. Relative total costs of preparation, logging, and administration of harvest cuts

Where it is determined by the interdisciplinary team that exceptions to the size limitation are warranted, the actual size limitation of openings may be up 100 percent greater for factor 9 and up to 50 percent greater for all other factors with the approval of the Forest Supervisor.

Exceptions to the 100 acre size limit in excess of 50 percent greater (100 percent greater for factor 9) are permitted on an individual timber sale basis after 60 days public notice, and review and approval by the Regional Forester.

The following tables display the units by alternative which exceed 100 acres in size. The reasons for exceeding the size limits are also displayed.

Units Over 100 Acres in Size

HARVEST UNIT#	ACRES	REASON	ALTERNATIVE NUMBER				
			2	3	4	5	6
3003	106	1,8,10	2		4		
3004	145	1,8,10	2				
3006	119	1,6,8,10	2	3	4		6
3027	102	1,8,10				5	
5023	101	1,6,8,10	2		4		
5027	103	1,8,10		3			6
5051	146	1,6,8,10					
6026	117	1,8,10		3			
6031	127	1,6,8,10		3	4		6
7094	134	1,6,8,10			4		
8029	106	1,8,10	2				
8038	134	1,8,10	2				
8040	103	1,8,10	2				
8069	117	1,8,10		3			6
8076	131	1,8,10		3			6
8079	114	1,8,10		3			
8104	135	1,8,10				5	
8112	146	1,6,8,10			4		
8113	107	1,6,8,10			4		
9029	103	1,8,10					
9038	114	1,8,10	2				
9057	108	1,8,10		3		5	6
9059	108	1,8,10		3			6
9084	144	1,8,10				5	
9096	134	1,6,8,10					
9101	131	1,6,8,10					

Over 100 Acres by Alternative	8	9	7	4	7
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Appendix C

Riparian Area Prescriptions

RIPARIAN AREA PRESCRIPTIONS

RP LUDs

The Riparian Area Land Use Designation (RP) is applied where more development-oriented riparian management would otherwise normally occur. At a minimum, the land area encompassed by this designation includes: 1) the riparian area required to meet the National Forest Management Act's implementing regulations for fish habitat and water quality; and, 2) the land area in which the commercial timber harvest restrictions of the Tongass Timber Reform Act (P.L. 101-931) are applied. Risks of effects to riparian resources are reduced by extending the Riparian Area Land Use Designation to beyond the area required by law.

Goals

To maintain riparian habitat for fish and other riparian-associated species and resources.

To meet the requirements of the National Forest Management Act and the Tongass Timber Reform Act for the protection of fish habitat and/or water quality.

Objectives

To emphasize the maintenance and improvement of fish habitat and populations by integrating aquatic and terrestrial ecosystems management.

Manage the habitat for riparian-associated wildlife species in Class I stream and lake areas to achieve old-growth characteristics.

Prohibit commercial timber harvest within 100 feet of either side of Class I streams, and within 100 feet of those Class II streams which flow directly into Class I streams. Allow timber harvest in other areas where it does not conflict with the maintenance or improvement of riparian-associated resources.

Objectives for fish habitat management:

- Maintain or improve fish habitat capability;
- Maintain natural stream bank and stream channel processes;
- Maintain natural and beneficial quantities of large woody debris over the short- and long-term;
- Maintain water quality to provide for fish production;
- Maintain optimum water temperatures for salmonids;
- Maintain or improve primary or secondary stream biological production in second-growth forests;
- Maintain fish passage through stream crossing structures.

Accommodate recreation facilities and uses associated with water-related activities which avoid adverse effects on water quality and riparian shorelines.

Desired Future Condition

Riparian areas throughout the forest provide high-quality habitat for fish and riparian-associated wildlife species. A wide variety of vegetative conditions and

types are present, benefiting a variety of species; also provided are reserve trees for wildlife, large trees for brown bear bedding areas, and associated waterfowl habitats. The areas also provide wildlife travel corridors.

Timber Harvest Prescription

The following tables provide the standards and guidelines for timber harvest activities. Distances are in slope distance measured from the ordinary high water mark (see glossary). Distances shown are for windfirm leave strips; greater distance may be required to achieve reasonable assurance that windthrow as the result of adjacent harvest activity will not occur within the windfirm distance. To design windfirm leave strips, consider conditions such as soils, local wind patterns, tree height and size, and other site-specific factors. Forest-wide and Land Use Designation-wide standards and guidelines apply for each channel process group.

Harvest Definitions

"no commercial timber harvest" - A standard that means commercial timber harvest shall be prohibited (Tongass Timber Reform Act of 1990)).

"no programmed commercial timber harvest" - A guideline and means that no timber harvest will be scheduled, but that unprogrammed commercial timber harvest could be allowed. Among other reasons, unprogrammed commercial timber harvest may include timber sold as part of a salvage sale, for insect and disease abatement purposes, and for specialty wood products.)

Flood Plain Process Group
(Channel types FP1, FP2, FP3, FP4, FP5)

Stream Class

	I
Objectives	<ul style="list-style-type: none"> - Maintain or improve aquatic biological productivity - Assure the protection of riparian habitat - Allow no measurable reduction in smolt habitat capability except when change is a result of natural processes - Restore stream and/or watershed condition where habitat capability has been reduced from the natural capability - Maintain/manage old-growth characteristic habitat for riparian-associated wildlife species - Maintain long-term supplies of large woody debris sources within the process group - Allow no activities which may cause floodplain destabilization
Harvest Control	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet in width on each side of all channel types - Allow single tree selection harvest within 100 to 200 feet in width on each side of FP3 channel types not associated with other channel types - Allow no programmed commercial timber harvest within 100 to 200 feet in width on each side for remainder of channel types - Consider all harvest methods, on a case-by-case basis, in the riparian area beyond 200 feet if the riparian area is greater than 200 feet
Harvest Rate	<ul style="list-style-type: none"> - Beyond 100 feet from the stream, strive to maintain 90% of the normal basal area with trees 16"+ dbh within areas with no programmed commercial timber harvest.
Salvage	<ul style="list-style-type: none"> - Allow no salvage in the "no commercial timber harvest" areas unless needed to meet process group objectives (e.g., windthrown trees restricting fish passage in streams) - Allow salvage in other areas while meeting objectives
Roading	<ul style="list-style-type: none"> - Locate roads in this process group only when other reasonably feasible routes do not exist.

NOTES:

- A primary consideration for timber harvest within this Land Use Designation is to maintain windfirmness of the unharvested trees. Where additional distance is required to provide for reasonable assurance of windfirmness, harvest may be allowed, but will be limited to uneven-aged silvicultural systems.
- Commercial timber harvest guidelines beyond 100 feet may vary, based on site-specific analysis, but must meet process group objectives.
- Beyond 100 feet of the stream, incidental cutting of trees may be allowed in areas not programmed for commercial timber harvest on a case-by-case basis (e.g., for bridge stringers, totem poles, etc.).
- Stream Classes II and III do not normally occur in this process group. If they should occur, harvest control must meet management objectives for Class II and III of the Alluvial Fan Process Group.

Alluvial Fan Process Group
(Channel types AF1, AF2, AF8)

Stream Class

	I	II	III
Objectives	<ul style="list-style-type: none"> - Allow no activities which may cause floodplain destabilization - Assure the protection of riparian habitat - Maintain or improve aquatic biological productivity - Allow no measurable reduction in smolt habitat capability except when change is a result of natural processes - Restore stream and/or watershed condition where habitat capability has been reduced from the natural capability - Maintain/manage old-growth characteristic habitat for riparian-associated wildlife species 	<ul style="list-style-type: none"> - Allow no activities which may cause floodplain destabilization - Assure the protection of riparian habitat - Maintain habitat capability for resident fish to the extent practicable 	<ul style="list-style-type: none"> - Allow no activities which may cause floodplain destabilization - Assure the protection of riparian habitat - Minimize the effects of timber harvest and related land disturbance activities on the beneficial uses of water by applying Best Management Practices.
Harvest Control	<ul style="list-style-type: none"> - Allow no commercial timber harvest within active portion of fan or 100 feet of channel, whichever is greater - All harvest methods are available on remaining inactive portion of fan while meeting objectives 	<ul style="list-style-type: none"> - Allow no commercial timber harvest within active portion of fan or 100 feet of channel, if the stream flows directly into a Class I stream (25 feet if not tributary to a Class I stream). - All harvest methods are available on remaining inactive portion of fan while meeting objectives - Allow single tree selection harvest within 25 to 60 feet from streambank if not within active portion of fan and not flowing directly into a Class I stream. 	<ul style="list-style-type: none"> - Allow no programmed commercial timber harvest within active portion of fan or 25 feet of streambank, whichever is greater - All harvest methods are available on remaining inactive portion of fan while meeting objectives

Stream Class

	I	II	III
Harvest Rate	- Beyond 100 feet of the stream, strive to maintain 90% of the normal basal area with trees 16"+ dbh within areas with "no programmed commercial timber harvest" (see note below)	- Harvest should not exceed 50% of the forest land of individual fan. Remaining forested land is not to be harvested until created openings contain 50 foot tall conifer trees (approximately 30 yrs.)	
Salvage	- Allow no salvage in the no commercial timber harvest area unless needed to meet process group objectives (e.g., windthrown trees restricting fish passage in streams) - Allow salvage in other areas while meeting objectives		- Allow salvage in all areas while meeting objectives
Roading	- Anticipate unstable stream channels in determining the feasibility and/or most practical road locations, stream crossings, and design.		

NOTES:

- A primary consideration for timber harvest within this Land Use Designation is to maintain windfirmness of the unharvested trees. Where additional distance is required to provide for reasonable assurance of windfirmness, harvest may be allowed but will be limited to uneven-aged silvicultural systems.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, commercial timber harvest guidelines may vary, based on site-specific analysis, but must meet process group objectives.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, incidental cutting of trees may be allowed in areas not programmed for commercial timber harvest on a case-by-case basis (e.g. for bridge stringers, totem poles, etc.).

Moderate Gradient Mixed Control Process Group
(Channel types MM1, MM2)

Stream Class

	I	II	III
Objectives	<ul style="list-style-type: none"> - Assure protection of riparian habitat. - Allow no activities which may cause floodplain destabilization. - Maintain or improve aquatic biological productivity - Allow no measurable reduction in smolt habitat capability except when change is a result of natural processes - Restore stream and/or watershed condition where habitat capability has been reduced from the natural capability - Maintain/manage old-growth characteristic habitat for riparian-associated wildlife species 	<ul style="list-style-type: none"> - Assure protection of riparian habitat. - Allow no activities which may cause floodplain destabilization - Maintain habitat capability for resident fish to the extent practicable 	<ul style="list-style-type: none"> - Assure protection of riparian habitat. - Allow no activities which may cause floodplain destabilization. - Minimize the effects of timber harvest and related land disturbance activities on the beneficial uses of water by applying Best Management Practices.
Harvest Control	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet of channels. - Allow single tree selection on remainder of the area. 	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet of streams which flow directly into Class I streams. For other streams, allow single tree selection harvest within 25 feet of MM1 channels and 60 feet of MM2 channels. - All harvest methods are available on remaining area; where timber harvest is allowed within 100 feet of the stream, final harvest should incorporate undulating unit boundaries to limit the amount of continuous disturbance parallel to the streambank 	<ul style="list-style-type: none"> - Allow single tree selection within 25 feet of MM1 channels - All harvest methods are available on remaining area while meeting objectives

Stream Class

	I	II	III
Harvest Rate	- Forest-wide Standards and Guidelines for timber apply		
Salvage	- Allow no salvage in the "no commercial timber harvest areas" unless needed to meet process group objectives (e.g., windthrown trees restricting fish passage in streams) - Allow salvage in all areas while meeting objectives - Allow salvage in other areas while meeting objectives		
Roading	- Special road construction techniques may be required to ensure fish passage		

NOTES:

- A primary consideration for timber harvest within this Land Use Designation is to maintain windfirmness of the unharvested trees. Where additional distance is required to provide for reasonable assurance of windfirmness, harvest may be allowed but will be limited to uneven-aged silvicultural systems.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, commercial timber harvest guidelines may vary, based on site-specific analysis, but must meet process group objectives.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, incidental cutting of trees may be allowed in areas not programmed for commercial timber harvest on a case-by-case basis (e.g. for bridge stringers, totem poles, etc.).

Large Contained Process Group (Channel types LC1, LC2)

Stream Class

	I	II
Objectives	<ul style="list-style-type: none"> - Maintain or improve aquatic biological productivity - Assure the protection of riparian habitat - Allow no activities which may cause floodplain destabilization - Allow no measurable reduction in smolt habitat capability except when change is a result of natural processes - Maintain/manage old-growth characteristic habitat for riparian-associated wildlife species 	<ul style="list-style-type: none"> - Maintain habitat capability for resident fish to the extent practicable - Assure the protection of riparian habitat - Allow no activities which may cause floodplain destabilization
Harvest Control	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet - All harvest methods are available on remaining area while meeting objectives - Full suspension yarding is required to cross stream channel 	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet of streams which flow directly into Class I streams - Allow no programmed commercial timber harvest within 25 feet of other streams - All silvicultural systems are available on remaining area while meeting objectives - Minimize soil disturbance associated with yarding within inner gorge - Full suspension yarding is required to cross stream channel
Salvage	<ul style="list-style-type: none"> - Allow no salvage in the "no commercial timber harvest" areas unless needed to meet process group objectives (e.g., windthrown trees restricting fish passage in streams) - Allow salvage in other areas while meeting objectives 	
Roading	<ul style="list-style-type: none"> - Road construction is generally not appropriate in this process group; where road crossings are required, minimize erosion and sedimentation associated with road crossing approaches within inner gorge 	

NOTES:

- A primary consideration for timber harvest within the Land Use Designation is to maintain windfirmness of the unharvested trees. Where additional distance is required to provide for reasonable assurance of windfirmness, harvest may be allowed but will be limited to uneven-aged silvicultural systems.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, commercial timber harvest guidelines may vary, based on site-specific analysis, but must meet process group objectives.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, incidental cutting of trees may be allowed in areas not programmed for commercial timber harvest on a case-by-case basis (e.g. for bridge stringers, totem poles, etc.).
- Stream Class III does not normally occur in this process group. If it should occur, Harvest Control must meet Management Objectives for Class III of the Moderate Gradient Contained Process Group.

Moderate Gradient Contained Process Group
(Channel types MC1, MC2, MC3)

Stream Class

	I	II	III
Objectives	<ul style="list-style-type: none"> - Assure the protection of riparian habitat - Allow no activities which may cause floodplain destabilization - Maintain or improve aquatic biological productivity - Allow no measurable reduction in smolt habitat capability except when change is a result of natural processes - Restore stream and/or watershed condition where habitat capability has been reduced from the natural capability - Maintain/manage old-growth characteristic habitat for riparian-associated wildlife species 	<ul style="list-style-type: none"> - Assure the protection of riparian habitat - Allow no activities which may cause floodplain destabilization - Maintain habitat capability for resident fish to the extent practicable 	<ul style="list-style-type: none"> - Assure the protection of riparian habitat - Allow no activities which may cause floodplain destabilization - Minimize the effects of timber harvest and related land disturbance activities on the beneficial uses of water by applying Best Management Practices.
Harvest Control	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet - Beyond 100 feet, selectively leave trees with crowns that do not extend above the slope break - Minimize soil disturbance associated with yarding within the inner gorge - Full suspension yarding required to cross stream channel - Maintain near-natural reserve tree component of stand 	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet of streams which flow directly into Class I streams - Selectively leave trees with crowns that do not extend above the slope break along streams which do not flow directly into Class I streams, and beyond 100 feet for other streams - Minimize soil disturbance associated with yarding within inner gorge - Full suspension yarding required to cross stream channel 	<ul style="list-style-type: none"> - All harvest methods are available while meeting objectives - Minimize soil disturbance associated with yarding within the inner gorge.

Stream Class

	I	II	III
Salvage	- Allow no salvage in the "no commercial timber harvest areas" unless needed to meet process group objectives (e.g., windthrown trees restricting fish passage in streams)		- Allow salvage in other areas while meeting objectives
Roading	- Where road crossings are required, minimize erosion and sedimentation associated with road crossing approaches within the inner gorge		

NOTES:

- A primary consideration for timber harvest within this Land Use Designation is to maintain windfirmness of the unharvested trees. Where additional distance is required to provide for reasonable assurance of windfirmness, harvest may be allowed but will be limited to uneven-aged silvicultural systems.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, commercial timber harvest guidelines may vary, based on site-specific analysis, but must meet process group objectives.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, incidental cutting of trees may be allowed in areas not programmed for commercial timber harvest on a case-by-case basis (e.g. for bridge stringers, totem poles, etc.).

High Gradient Contained Process Group
(Channel types HC1, HC2, HC3, HC4, HC5, HC6, HC8, HC9)

Stream Class

	II	III
Objectives	<ul style="list-style-type: none"> - Maintain habitat capability for resident fish to the extent practicable - Assure the protection of riparian habitat - Allow no activities which may cause floodplain destabilization. 	<ul style="list-style-type: none"> - Minimize the effects of timber harvest and related land disturbance activities on the beneficial uses of water by applying Best Management Practices. - Assure the protection of riparian habitat - Allow no activities which may cause floodplain destabilization
Harvest Control	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet of streams which flow directly into Class I streams - Selectively leave trees with crowns that do not extend above the slope break along streams which do not flow directly into Class I streams and beyond 100 feet for other streams. - Minimize soil disturbance associated with yarding within inner gorge. - Full suspension yarding required to cross stream channel. 	<ul style="list-style-type: none"> - Allow harvest to streambank while meeting objectives - Full suspension required to cross stream channel
Harvest Rate	<ul style="list-style-type: none"> - Harvest rate not to exceed 25% of the acres every 20 years of a 3rd order or larger watershed. (Note: this guideline applies only to those acres associated with this LUD) 	
Salvage	<ul style="list-style-type: none"> - Allow no salvage in the "no commercial timber harvest areas" unless needed to meet process group objectives (e.g., windthrown trees restricting fish passage in streams) - Allow salvage in other areas while meeting objectives. 	<ul style="list-style-type: none"> - Allow salvage while meeting objectives

- NOTES:**
- Commercial timber harvest guidelines may vary, based on site-specific analysis, but must meet process group objectives.
 - Stream Class I does not normally occur in this process group. If they should occur, Harvest Control must meet Management Objectives for Class I of the Moderate Gradient Contained Process Group.

Palustrine Process Group
(Channel types PA1, PA2, PA3, PA4, PA5)

Stream Class

	I	II
Objectives	<ul style="list-style-type: none"> - Maintain or improve aquatic biological productivity - Assure the protection of riparian habitat - Allow no activities which may cause floodplain destabilization - Restore stream and/or watershed condition where habitat capability has been reduced from the natural capability - Allow no measurable reduction in smolt habitat capability except when change is a result of natural processes - Maintain/manage old-growth characteristic habitat for riparian-associated wildlife species 	<ul style="list-style-type: none"> - Maintain habitat capability for resident fish to the extent practicable - Assure the protection of riparian habitat - Allow no activities which may cause floodplain destabilization
Harvest Control	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet - Allow no programmed commercial timber harvest beyond 100 feet 	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet of streams which flow directly into Class I streams - Allow no programmed commercial timber harvest along other streams and, for all streams, beyond 100 feet
Salvage	<ul style="list-style-type: none"> - Allow no salvage in the "no commercial timber harvest areas" unless needed to meet process group objectives (e.g., windthrown trees restricting fish passage in streams) - Allow salvage in other areas using non-ground disturbing methods, while meeting objectives e.g. helicopter) 	
Roading	<ul style="list-style-type: none"> - Wetland values should receive special consideration in locating roads. 	

NOTES:

- A primary consideration for timber harvest within this Land Use Designation is to maintain windfirmness of the unharvested trees. Where additional distance is required to provide for reasonable assurance of windfirmness, harvest may be allowed but will be limited to uneven-aged silvicultural systems.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, commercial timber harvest guidelines may vary, based on site-specific analysis, but must meet process group objectives.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, incidental cutting of trees may be allowed in areas not programmed for commercial timber harvest on a case-by-case basis (e.g. for bridge stringers, totem poles, etc.).
- Stream Class III does not normally occur in this process group. If it should occur, Harvest Control must meet Management Objectives for Class III of the Moderate Gradient Contained Process Group.

Lakes and Ponds
(Channel types not classified as streams)

Stream Class

	I	II	III
Objectives	<ul style="list-style-type: none"> - Maintain or improve aquatic biological productivity - Assure the protection of riparian habitat - Restore stream and/or watershed condition where habitat capability has been reduced from the natural capability - Allow no measurable reduction in smolt habitat capability except when change is a result of natural change - Maintain/manage old-growth characteristic habitat for riparian-associated wildlife species 	<ul style="list-style-type: none"> - Maintain habitat capability for resident fish to the extent practicable - Assure the protection of riparian habitat 	<ul style="list-style-type: none"> - Minimize the effects of timber harvest and related land disturbance activities on the beneficial uses of water by applying Best Management Practices. - Assure the protection of riparian habitat
Harvest Control	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet - Allow uneven-aged management 100 to 500 feet of lake or pond, or the extent of this LUD, whichever is less - Any silvicultural system applies for remainder of area while meeting objectives. 	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet in width of lakes and ponds which: 1) flow directly into a Class I stream, or 2) flow into a Class II stream which flows directly into a Class I stream - For lakes and ponds not flowing directly into a Class I stream, allow uneven-aged management within 100 feet of lakes and ponds less 50 acres - Allow uneven-aged management 100 to 500 feet, or extent of land use designation whichever is less, of lakes greater than 50 acres - Any silvicultural systems apply for the remainder of the area while meeting objectives - Treat as the adjacent LUD if lake or pond is less than 5 acres 	<ul style="list-style-type: none"> - Maintain a minimum of 50% of natural shading vegetation for temperature sensitive lakes - All silvicultural systems available while meeting objectives - Treat as the adjacent LUD if lake or pond is less than 5 acres

Stream Class

	I	II	III
Salvage	<ul style="list-style-type: none"> - Allow no salvage in the "no commercial timber harvest areas" unless needed to meet process group objectives (e.g., windthrown trees restricting fish passage in streams) - Allow salvage in other areas while meeting objectives 		<ul style="list-style-type: none"> - Allow salvage in all areas while meeting objectives
Roading	<ul style="list-style-type: none"> - Roads may be allowed if other practical alternatives are not available or if needed to access the water body for recreation or other needs 		

NOTE:

- A primary consideration for timber harvest within this Land Use Designation is to maintain windfirmness of the unharvested trees. Where additional distance is required to provide for reasonable assurance of windfirmness, harvest may be allowed but will be limited to uneven-aged silvicultural systems.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, commercial timber harvest guidelines may vary, based on site-specific analysis, but must meet process group objectives.
- Except within 100 feet of a Class I stream and 100 feet of a Class II stream which flows directly into a Class I stream, incidental cutting of trees may be allowed in areas not programmed for commercial timber harvest on a case-by-case basis (e.g. for bridge stringers, totem poles, etc.).

Estuarine Process Group*
(Channel types ES1, ES2, ES3, ES4, ES8)

Stream Class

	I
Objectives	<ul style="list-style-type: none"> - Maintain or improve aquatic biological productivity - Assure the protection of riparian habitat - Allow no measurable reduction in smolt habitat capability except when change is a result of natural processes - Restore stream and/or watershed condition where habitat capability has been reduced from the natural capability - Maintain/manage old-growth characteristic habitat for riparian-associated wildlife species
Harvest Control	<ul style="list-style-type: none"> - Allow no commercial timber harvest within 100 feet - Allow no programmed commercial timber harvest within 100 to 500 feet of ES4 and ES8 estuarine channels, or the extent of this Land Use Designation, whichever is less - Allow no programmed commercial timber harvest within 100 to 200 feet of ES2 and ES3 estuarine channels, or the extent of this Land Use Designation, whichever is less - Allow uneven-aged silvicultural system for remainder of area
Harvest Rate	<ul style="list-style-type: none"> - Beyond 100' from the stream, strive to maintain 90% of the normal basal area with trees 16"+ dbh within areas with no programmed commercial timber harvest (see note below)
Salvage	<ul style="list-style-type: none"> - Allow no salvage in the "no commercial timber harvest areas" unless needed to meet process group objectives (e.g., windthrown trees restricting fish passage in streams) - Allow salvage in other areas while meeting objectives
Roading	<ul style="list-style-type: none"> - Juvenile fish passage may require special attention - Generally, no roading should occur in estuarine wetland areas

NOTES:

- * This area is often covered by the Beach Fringe and Estuarine Forestwide Standards and Guidelines which would take precedence over management under the Riparian Area Prescription.
- A primary consideration for timber harvest within this Land Use Designation is to maintain windfirmness of the unharvested trees. Where additional distance is required to provide for reasonable assurance of windfirmness, harvest may be allowed but will be limited to uneven-aged silvicultural systems.
- Commercial timber harvest guidelines beyond 100 feet may vary, based on site-specific analysis, but must meet process group objectives.
- Beyond 100 feet of the stream, incidental cutting of trees may be allowed in areas not programmed for commercial timber harvest on a case-by-case basis (e.g., for bridge stringers, totem poles, etc.).
- Stream Classes II and III do not normally occur in this process group. If they should occur, Harvest Control must meet Management Objectives for Class II and III of the Lakes and Ponds Process Group.

Appendix D


Biological Assessment




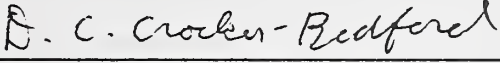
BIOLOGICAL ASSESSMENT

FOR THE NORTH REVILLA PROJECT AREA

UNITED STATES DEPARTMENT OF AGRICULTURE
TONGASS NATIONAL FOREST
KETCHIKAN AREA

PREPARED BY:  DATE: 3-2-93
NORMAN M. MATSON
Land Management Planner - Wildlife

 DATE: 3-3-93
PAUL A. ZELLMER
Land Management Planner - Fisheries

 DATE: 3-17-93
COLE CROCKER-BEDFORD
Wildlife and TES Program Manager

BIOLOGICAL ASSESSMENT for the North Revilla Project Area

March 1993

This Biological Assessment was prepared for the North Revilla Project Area as required by Section 7 of the Endangered Species Act (as amended) and the USDA Forest Service threatened, endangered, and sensitive plant and animal species policy (FSM 2670). This assessment documents the occurrence of Federal and State threatened, endangered, and candidate species; critical habitats within the Project Area, and potential effects of the proposed actions on habitats or species.

An Environmental Impact Statement is being prepared for the North Revilla Project Area. The action includes the harvest of approximately 5,769 to 8,585 acres of old-growth forest, construction of 100-153 miles of new roads, the use of six existing log transfer facilities, and the construction of two or three new log transfer facilities. The North Revilla Project Area includes 109,520 acres, approximately 30 air miles north of Ketchikan, Alaska. It encompasses an area of northwest Revillagigedo (Revilla) Island, from Indian Point on the southwest end, to Beaver Creek on the northeast along Behm Canal. It includes the drainages associated with Gedney Pass, Neets Bay, and Traitors Cove. The Project Area includes Wildlife Analysis Areas (WAA's) 509 and 510.

This Biological Assessment has been completed for the endangered humpback whale (*Megaptera novaeangliae*), American peregrine falcon (*Falco peregrinus anatum*), and the Eskimo curlew (*Numenius borealis*); the threatened Arctic peregrine falcon (*Falco peregrinus tundris*), Aleutian Canada goose (*Branta canadensis leucopareia*), and the Steller sea lion (*Eumetopias jubata*); one candidate frog species, four candidate plant species, and three candidate bird species.

I. IDENTIFICATION OF ENDANGERED AND THREATENED SPECIES AND/OR CRITICAL HABITATS FOR SUCH SPECIES WITHIN THE PROJECT AREA.

A. Federal Threatened, Endangered, and Candidate Species

Federal listed threatened and endangered species are those plants and animal species formally listed by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), under the authority of the Endangered Species Act of 1973, as amended. An endangered species is defined as one which is in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as one which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Candidate species are those being considered for listing as threatened or endangered by the USFWS or NMFS. A category 1 candidate is one for which the agency has sufficient data in its possession to supporting listing the species as threatened or endangered. Category 2 candidate species are those species for which there is information indicating the species might qualify for endangered or threatened status, but for which further evaluation is needed. Category 3 candidate species are species that were considered for listing as endangered or threatened, but are no longer under consideration.

Species listed as endangered or threatened are provided statutory protection under the Endangered Species Act of 1973, as amended; candidate species are not. Therefore, technically, under the Endangered Species Act, agencies have no legal obligation to take action on Category 2 or 3 species.

B. State of Alaska Endangered Species

The State of Alaska has an Endangered Species Law which authorizes the Commissioner of the Alaska Department of Fish and Game (ADF&G) to list Alaska endangered species.

Table 1 summarizes the threatened, endangered, and candidate species of animals and plants occurring on or near the North Revilla Project Area which are under the jurisdiction of the USFWS or NMFS.

Table 1
Threatened, Endangered, and Candidate Species Occurring On or Near the North Revilla Project Area.

SPECIES		STATUS		
		Federal		State
	Threatened	Endangered	Candidate	
Humpback whale		E		E
Steller Sea Lion	T			
American Peregrine Falcon		E		E
Arctic Peregrine Falcon	T		E	
Aleutian Canada goose	T			E
Eskimo curlew		E		E
Marbled Murrelet			2	
Northern Goshawk			2	
Harlequin Duck			2	
Spotted Frog			2	
Aster yukonensis			2	
Calamagrostis crassiglumis			2	
Carex lenticularis var. dolia			2	
Montia bostockii			2	

There has been no critical habitat officially designated for any of these species at this time in Southeast Alaska.

The USFWS has identified northern goshawk and marbled murrelet as being species of concern within the North Revilla Project Area (Holmberg March 5, 1992). The endangered American peregrine falcon may migrate through the Revillagigedo Island area, as may the Eskimo curlew, Aleutian Canada goose, and Harlequin duck (Holmberg March 5, 1992). There has been no evidence of the existence of any other listed species within the Project Area.

The humpback whale (*Megaptera novaeangliae*) and Steller sea lion (*Eumetopias jubata*) were listed by the National Marine Fisheries Service (NMFS) in an assessment of the Project Area (Pennoyer February 6, 1992). During 1991, NMFS completed final recovery plans for the humpback whales. The Steller (northern) sea lion

is currently listed as threatened (*Federal Register* Dec. 4, 1990; NMFS 1992). Presently, critical habitat has not been designated for either species (Pennoyer February 6, 1992).

No plant species known to occur in the Project Area have been determined to be threatened, endangered, or sensitive. Category 2 plants *Calamagrostis crassiglumis* and *Carex lenticularis* could potentially occur within the Project Area, but have not been documented.

No fish species known to occur in the Project Area have been determined to be threatened, endangered, or sensitive.

II. SPECIES ASSESSMENTS

HUMPBACK WHALE (*Megaptera novaeangliae*)

Distribution and Population

Humpback whales are the most abundant of the eight species of endangered whales that occur in Southeast Alaska waters. Their population in the North Pacific is about 1,200, which is about eight percent of the prewhaling population. These whales are regularly sighted in the Inside Passage and coastal waters of the Southeast Alaska panhandle from Yakutat Bay south to Queen Charlotte Sound. Humpback whales feed in Southeast Alaskan panhandle waters from about May through December, although some have been seen every month of the year. Peak numbers of whales are usually found in nearshore waters during late August and September, but substantial numbers usually remain until early winter. Baker et al. (1985) estimate that 300-350 humpback whales inhabit Southeast Alaska during the summer and fall.

The local distribution of humpbacks in Southeast Alaska appears to be correlated with the density and seasonal availability of prey, particularly herring (*Clupea harengus*) and euphausiids. Important feeding areas include Glacier Bay and adjacent portions of Icy Strait, Stephens Passage/Frederick Sound, Seymour Canal and Sitka Sound. Glacier Bay and Icy Strait appear to be an important feeding area early in the season, when whales prey heavily on herring and other small, schooling fishes. Frederick Sound is important later in summer, when whales feed on swarming euphausiids. During autumn and early winter, humpbacks move out of the Sound to areas where herring are abundant, particularly Seymour Canal. Other areas of Southeast Alaska may also be important for humpbacks and need to be evaluated. These include: Cape Fairweather, Lynn Canal, Sumner Strait, Dixon Entrance, the west coast of Prince of Wales Island, and offshore banks such as the Fairweather Grounds.

Because the humpback inhabits shallow coastal areas, it is increasingly exposed to human activity. Consequently, these whales may be more susceptible to confrontational disturbance, displacement, and loss of habitat from environmental degradation than some other whale species. Humpbacks summering in Southeast Alaska have been linked to each of three wintering areas in Mexico, Hawaii, and Asia.

Effects of North Revilla Proposed Actions on Population or Habitat

The recovery plans for the humpback whale identified six known or potential categories of human impacts to these species: hunting, entrapment and entanglement in fishing gear, collisions with ships, acoustic disturbance, habitat degradation, and competition for resources with humans.

National Forest management activities which may have an effect on whale habitats or populations generally fall into the categories of acoustic disturbance and habitat degradation. These management activities include: the development and use of log transfer facilities (LTF's) and their associated camps, the movement of log rafts from log transfer facilities to mills, and the potential development of other docks and associated facilities for mining, recreation, and other forest uses and activities. Generally, with the development and use of LTF's and other docking facilities for projects, there is an associated increase in recreational boating in the immediate vicinity during the construction and use of the facilities.

Most of the information and data for whales in Southeast Alaska are associated with one species, the humpback whale, because it is the most abundant whale to occur in Southeast Alaska waters. The other seven species of whales are either present only seasonally as they migrate along the outer coastal areas, or are only occasionally found in the inside coastal waters of Southeast Alaska. The following discussion and analysis is primarily based on humpback whales, but is assumed to be applicable to the other species of whales.

Construction and operation of LTF's and other docking facilities are restricted to small, very localized areas of the marine environment. There are six LTF's currently on the Project Area (# 16-Fire cove, # 2-Hassler, # 4-Klu Bay, # 24-Margaret bay, # 17-NW Neets, and # 5- Shrimp Bay-See attached map). An estimated 6 acres of marine benthic disturbance associated are with these existing LTF's could occur as a result of bark deposition. All LTF's in the Project area have been designed to maximize flushing suspended bark away from the LTF area to the open sea before it can accumulate on the bottom. Three new LTF's are proposed for construction under the North Revilla EIS (# 7-Chin Point, # 22-North Traitors, and # 18-NW Traitors-See attached map). Less than one acre of marine benthic habitat would be impacted by the construction of three new LTF's.

There is little potential to directly affect whales with these facilities. During the summer of 1989, there was a report of a humpback whale entangled in some cables from an inactive LTF site on the Stikine Area. This is the only known direct effect incident related to LTF's.

Two potential indirect effects of LTF's and other docking facilities and associated activities have been identified: 1) effects on whale prey species, and 2) disturbances of whales by boat traffic associated with LTF's.

Effects on Prey. Nemoto (1970) noted that euphausiids and gregarious fish are the primary prey of humpbacks. Thirteen species of fish and 57 species of invertebrates were identified as humpback whale prey in Southeast Alaska. Humpbacks studied in Glacier Bay and Stephens Passage-Frederick Sound were found most frequently in areas of high prey density (Wing and Krieger 1983).

Construction and operation of all LTF's and similar facilities require U.S. Army Corps of Engineer and U.S. Environmental Protection Agency permits, and State of Alaska tidelands permits. The permitting process provides that construction and operation maintain water quality in the specific facility locations, and that marine circulation and flushing are maintained. All facilities must be in conformance with permit standards. Although the effects may vary locally, the major effect of leachates (ie. terpene, alpha-conindentric acid, alpha-conindentrin, hydroxymatairesinol, linoletic acid, and dehydroabientic acid) from stored log rafts, is upon invertebrates.

Crustaceans, shrimp, and crab larvae, seem especially sensitive (Pease 1973, Buchanan and Tate 1976). EPA measuring techniques may be required to monitor the LC₅₀ levels at each LTF (Peltier and Weber 1985) in order to insure impacts are limited to the approved "zone of deposit". A local increase in the herring and herring egg fishery could also impact this food item.

Effects from Disturbance. Humpback whale response to nearby boating activity varies from no apparent response to pod dispersal, sounding, breaching, evasive underwater maneuvers, and maintaining distance (Baker and Herman 1983, Baker et. al. 1982). Disturbance by boat activity has been suggested as one of the

possible causes of observed changes in whale distribution in Southeast Alaska. Direct pursuit of whales by boats, and frequent changes in boat speed and direction appear to elicit avoidance behaviors more frequently than other types of boat traffic. However, whales may readily habituate to constant and familiar noise (Norris and Reeves 1978). Whales can be commonly found in some areas of Southeast Alaska which have considerable boat traffic. Whether they are habituated to boat traffic has not yet been documented. Adverse effects from current levels of boat traffic have not yet been documented.

Two basic types of boat activity associated with LTF's are log raft towing and recreational boating by workers. Log raft towing frequency would vary between camps, seasons, and years, with an average of about once a week during the working season (U.S.D.A. Forest Service 1989). Tug boats maintain relatively constant speeds and directions during log raft towing; constant speed and direction elicit less avoidance behavior from whales than other types of boating activity. Log raft towing routes are generally well established, and adverse effects from log raft towing have not been documented.

Recreational boating activity by camp residents would vary between seasons, years, and camps of different sizes. This activity would be concentrated near LTF sites, other docking facilities, and camps. It is estimated that most recreational boating would occur within a few miles of the site, few trips would be made over 10 miles, and activity greater than 30 miles from a site would be negligible. This boating would involve frequent changes in speed and direction and may include some small amount of whale pursuit, if the whales are within sight of the camp or an occupied boat. The effect of such recreational activity on whales would depend on many factors such as size of the bay, depth of the waters in the bay, number of boats, individual behavior responses of the whales, etc. At the present time, there is not a quantifiable way to estimate these possible effects.

The following Forest-wide standards and guidelines have been developed for application on all Forest Service permitted or approved activities and have been incorporated into the Revilla FEIS from the Supplement DEIS Tongass Land Management Plan by reference:

Provide for the protection and maintenance of whale habitats:

1. Avoid intentional aircraft flights below 500 feet above ground level in the known vicinity of whales on Forest Service permitted or approved activities, when weather ceilings permit.
2. Avoid intentional approach in a vessel of 100 feet or more in length to within 1/4 mile of whales on Forest Service permitted or approved activities, when safe passage exists.
3. Avoid intentional approach in a vessel of less than 100 feet in length to within 100 yards of whales on Forest Service permitted or approved activities, when safe passage exists.

No adverse effects on whales from implementation of Forest management activities are anticipated. Indirect effects may be associated with possible increased boating activity, but are localized in nature, and would be highly variable depending on many factors. To what extent indirect effects influence population levels of humpback whales is not known. No adverse or cumulative effects on whale populations or their habitats are anticipated with any of the alternatives.

STELLER SEA LION (*Eumetopias jubata*)

Distribution and Population

The Steller (northern) sea lion ranges from Hokkaido, Japan, through the Kuril Islands and Okhotsk Sea, Aleutian Islands and central Bering Sea, Gulf of Alaska, Southeast Alaska, and south to central California. There is not sufficient information to consider animals in different geographic regions as separate populations. The centers of abundance and distribution are the Gulf of Alaska and Aleutian Islands, respectively.

In 1990, because of an abrupt population decline observed over the last 31 years (primarily in the former Soviet Union, Gulf of Alaska, and Aleutian Islands), the NMFS listed the Steller sea lion as a threatened species throughout its range. The number of sea lions observed on certain rookeries from Kenai Peninsula to Kiska Island declined by 63 percent since 1985 and by 82 percent since 1960. Significant declines have also occurred on the Kuril Islands. Information on population trends in Southeast Alaska is sketchy, but what data does exist suggests that Southeast populations are stable or perhaps slightly decreasing.

When the sea lion was given emergency listing as a threatened species in the *Federal Register* (April 5, 1990), buffer zones restricting human activities were established around rookeries west of 150 degrees west longitude (does not include Southeast Alaska). The closest Steller sea lion rookery to the North Revilla Project Area is on Forrester Island. A recovery team has prepared a draft recovery plan.

A sea lion haulout, for sunning and resting, has been observed near the Project Area. Grindall Island at the south tip of Kasaan Peninsula, Prince of Wales Island is an important haulout area. Important food resources include salmon, eulachon, and cephalopod mollusks.

Effects of North Revilla Proposed Actions on Population or Habitat

The NMFS provides a summary of factors affecting the Steller sea lion (*Federal Register* April 5, 1991). These factors include reductions in the availability of food resources, especially pollock, which is the most important prey species for sea lions; commercial harvests of sea lion pups; harvests for subsistence and for public display and scientific research purposes; predation by sharks, killer whales, and brown bear; disease; the inadequacy of existing regulations regarding quotas on the incidental harvesting of sea lions during commercial fishing operations; other natural or human incidences such as shooting adult sea lions at rookeries, haulout sites, and in the water near boats. None of these factors are regulated by or within the jurisdiction of the Forest Service.

Southeast Alaska populations of Steller sea lions have not declined to the extent that other populations have. Harassment or displacement of sea lions from preferred habitats by human activities such as boating, recreation, aircraft, log transfer facilities, log raft towing, etc., is a concern with regard to long-term conservation of the sea lion in Southeast Alaska. Forest-wide standards and guidelines direct the Forest Service to prevent and/or reduce potential harassment of sea lions and other marine mammals due to activities carried out by or under the jurisdiction of the Forest Service, and these have been incorporated by reference into the North Revilla FEIS from the Supplement DEIS Tongass Land Management Plan. These Forest-wide standards and guidelines are as follows:

Provide for the protection and maintenance of harbor seal, Steller sea lion, and sea otter habitats.

1. Ensure that Forest Service permitted or approved activities are conducted in a manner consistent with the Marine Mammal Protection Act and the Endangered Species Act. "Taking" of marine mammals is prohibited; taking includes harassment, pursuit, or attempting any such activity.

2. Locate facilities and concentrated human activities requiring Forest Service approval as far from known marine mammal haulouts, rookeries and known concentration areas as practicable. The following distances are provided as general guidelines for maintaining habitats and reducing human disturbance:
 - * Facilities, camps, LTF's, campgrounds and other developments should be located 1 mile from known haulouts, and farther if the development is large.
 - * For aircraft flights on Forest Service approved projects, when weather ceilings permit, maintain a constant flight direction and airspeed and a minimum flight elevation of 1,000 feet (305 meters) within .5 miles (800 meters) of the haulouts.
 - * For boat traffic on Forest Service approved projects, remain at least .5 miles (800 meters) away from hauled-out harbor seals during the pupping and rearing season (15 May - 1 July). Minimize disturbance of seals with pups in the water by remaining at least 330 feet (100 meters) away from parturient seals. (Note: These distances are derived from a study in a park where hunting is prohibited and access is restricted and where viewing seals is encouraged. These distances may be too liberal and may need to be enlarged in situations where access and hunting are not controlled and where seals would be expected to be more reactive to boat traffic.)
 - * Minimize disturbance effects of boat traffic: for molting harbor seals, remain .5 miles (800 meters) away from haulouts where seals are molting; for Steller sea lions, remain at least .5 miles (800 meters) away from haulouts and rookeries; for sea otters, avoid known feeding and resting concentration areas, especially following prolonged stormy periods when sea otters have been unable to feed.
 - * Individuals associated with Forest Service permitted or approved activities will not intentionally approach within 100 yards, or otherwise intentionally disturb or displace any hauled-out marine mammal.
3. Cooperate with State and other Federal agencies to develop sites and opportunities for the safe viewing and observation of marine mammals by the public. Maintain a public education program explaining Forest management activities related to marine mammals in cooperation with State and other Federal agencies.

No direct effects on sea lions from Forest management activities are anticipated. Forest-wide standards and guidelines have been developed (U.S.D.A. Forest Service 1991b) and adopted in the North Revilla DEIS to prevent and/or reduce indirect effects of harassment or displacement due to Forest management activities. No adverse effects on sea lion populations or their habitats are anticipated with any of the alternatives.

AMERICAN PEREGRINE FALCON (*Falco peregrinus anatum*)

Distribution and Population

The American peregrine falcon is primarily associated with interior Alaska for breeding, nesting and rearing of young. The falcon is highly migratory, wintering as far south as northern Argentina and occurring in Southeast Alaska only during migration periods (Ambrose, et al., 1988). Reproduction has increased population numbers three-fold in Alaska (ADF&G letter Feb. 6, 1987, Ambrose, et al., 1988, minutes of Interagency Wildlife Technical Committee Meeting of March 29, 1991). The USFWS is considering removing the species from the endangered list.

Effects of North Revilla Proposed Action on Population or Habitat

The American and arctic peregrine falcons occur in Southeast Alaska only during migration. The primary reason for past declines in peregrine falcon populations was the proliferation of organochlorine pesticides, especially DDT and its principal metabolite DDE (Ratcliff 1969; Peskall 1976; Cade et al. 1971; Peskall and Kiff 1979; USFWS 1982). No organochlorine pesticides are authorized for use on the Tongass National Forest.

During migration through Southeast Alaska, the availability and abundance of prey species will most likely be the primary habitat factor affecting peregrine falcons. In coastal areas of Washington, the primary prey species for peregrine falcons were shorebirds and waterfowl species; passerine birds were also identified in the diet (Anderson and Debruyne 1979; Anderson et al. 1980). It is assumed that food sources would be similar for coastal Alaska.

Peregrines forage over open sites such as over bodies of water, marshes, grasslands, and shorelines, as well as above wooded areas. Peregrines attack flying prey from above or by chasing them. Although they forage over wide areas, they also have preferred foraging sites (White 1974).

Actual migration routes and patterns, and foraging areas, have not been identified for these two subspecies of peregrines in Southeast Alaska. Forest-wide standards and guidelines have been developed for protecting seabird rookeries and waterfowl concentration areas (pages 4-102 to 4-104 in U.S.D.A. Forest Service 1991b). A wide variety of passerine (perching and song) birds will be available from numerous open and forested communities under all alternatives associated with the North Revilla Project.

No adverse effects on American and Arctic peregrine falcon populations or their habitats are anticipated with any Forest management activities under any of the alternatives. Population numbers of both the American and Arctic peregrine falcon populations are continuing to increase (ADF&G letter dated February 6, 1987; Ambrose et al. 1988).

ARCTIC PEREGRINE FALCON (*Falco peregrinus tundris*)

Distribution and Population

The Arctic peregrine falcon is primarily associated with the area north of the Brooks Range and Seward Peninsula; it is highly migratory, wintering as far south as northern Argentina (Ambrose et al. 1988). It occurs in Southeast Alaska only during migration periods. Reproduction has increased population numbers three-fold in Alaska (ADF&G letter Feb. 6, 1987; Ambrose et al. 1988; minutes of Interagency Wildlife Technical Committee Meeting of March 20, 1991). The USFWS is considering removing the species from the threatened list.

Effects of North Revilla Proposed Action on Population or Habitat

See above, American Peregrine Falcon.

ALEUTIAN CANADA GOOSE (*Branta canadensis leucopareia*)

Distribution and Population

The breeding, nesting, and rearing of young Aleutian Canada geese is primarily associated with the Aleutian Islands. The Aleutian Canada goose winters in western Oregon, and in northwestern and central California. Although their movements within Alaska are not well known, the Aleutian Canada goose may occur in Southeast Alaska during migration. Population numbers in Alaska are increasing, and the USFWS is considering removing the species from the threatened list.

Effects of North Revilla Proposed Action on Population or Habitat

The Aleutian Canada goose is not primarily associated with Southeast Alaska. Although migration patterns in Alaska are not well known, Aleutian Canada geese may occur in Southeast Alaska as migrants. Due to the limited use of the Project Area by Aleutian Canada geese, no adverse effects on their population by any of the alternatives is anticipated.

ESKIMO CURLEW (*Numenius borealis*)

Distribution and Population

The Eskimo curlew is primarily associated with western and northern Alaska. The Eskimo curlew is rare and not typically found in Southeast Alaska, but it may occur as a migrant.

Effects of North Revilla Proposed Action on Population or Habitat

Due to the limited use of the Project Area by the Eskimo curlew, no adverse effects on their population by any of the alternatives is anticipated.

MARBLED MURRELET (*Brachyramphus marmoratus*)

The marbled murrelet is a small seabird that belongs to the family Alcidae. It is found throughout the North Pacific, the Asia subspecies (*B. m. perdix*) ranges from the Sea of Okhotsk, Kamchatka and Commander Islands, south to Korea, Japan and Kurile Islands. The North American subspecies (*B. m. marmoratus*) ranges from the Aleutian Archipelago in Alaska, eastward to Cook Inlet, Kodiak Island, Kenai Peninsula, and Prince William Sound, southward coastally throughout the Alexander Archipelago of Alaska and through British Columbia, Washington, Oregon to central California, with individuals wintering as far south as southern California (Marshall 1988, USFWS 1992).

The species feeds below the water's surface on small fish and invertebrates in near-shore marine waters (Marshall 1988, USFWS 1992).

Marbled murrelets nest on land or in trees and lay only one egg. They are semi-colonial in their nesting habitats; nesting marbled murrelets are often aggregated (USFWS 1992). Alaska is the only state where marbled murrelets are known to nest on the ground in treeless areas. Five ground nests have been identified with certainty, based on sightings of the incubating bird (Mendenhall 1992). Twenty-three tree nests have been located in North America (16 in Oregon, Washington and California; 2 in British Columbia and 5 in Alaska). All 16 nests found in Washington, Oregon and California were located in old-growth trees that ranged in diameter at breast height from 35 inches to 210 inches. Nests were located high above the ground and usually had good overhead protection (USFWS 1992). Both males and females incubate marbled murrelet eggs; one bird stays at the nest for 24 hours, while the other is feeding on the ocean. After hatching their young, the adults stay at the nest with the young bird for only about four days. After that, the young bird is left alone in the nest, except when the adults return to the nest to feed it (Interagency Meeting Records June 12, 1989).

Except for the fall period when they are molting, flightless, and stay on the ocean, birds have been known to fly to tree stands every month of the year. In Washington, birds have been recorded up to 50 miles inland (Hamer and Cummins 1991, in USFWS 1992).

Overview of work in Alaska. There is a current upland study of marbled murrelets on Naked Island in Prince William Sound. In the study area, murrelets flew most frequently into two areas with steep slopes facing west, and 70-80% cover of hemlock old-growth. A cursory review of the small sample suggested greater murrelet use of inland areas at the heads of bays as opposed to the outer peninsulas. Slopes facing northeast, west or southwest may have greater use than slopes facing north, northeast or southeast on Naked Island (Kuletz 1991).

A cooperative pilot study/survey between the Forest Service and the USFWS began in the summer of 1991, to evaluate possible at-sea survey techniques. Data from this study will be used to develop a statistically valid sampling design for a region-wide inventory to ascertain abundance and distribution of marbled murrelets in Southeast Alaska. This work will continue in 1993 and will include studies to evaluate factors which affect daily and seasonal distributions of murrelets.

Marbled murrelets are common along the coast of the Project Area. Boat transect surveys were conducted along the shoreline of logged and unlogged areas by the Craig and Misty Fiords Ranger Districts in 1991; these surveys counted 7.5 and 10 marbled murrelets per kilometer traveled parallel to the shoreline in transects 200 meters wide. Assuming that marbled murrelets along the North Revilla coast nest within the North Revilla Project Area, and assuming a conservative estimate of seven marbled murrelets per kilometer of shoreline for the North Revilla Project Area, then North Revilla (202 km of shoreline) might provide habitat for 1,414 marbled murrelets. This figure is likely low, because the Craig and Misty survey figures were for 200 meter wide transects, not for all distances out from the shoreline. The estimate for North Revilla assumes that the figure from the Craig vicinity can be extrapolated to North Revilla and that birds nest in the general vicinity of where they are seen at sea.

In 1984 during a marbled murrelet research project conducted by the ADF&G, a tree nest was found on Baranof Island. This nest was on a large horizontal limb, 82 feet up in a mountain hemlock tree. In 1989, two more tree nests were found in California. Both nests were in large Douglas-fir trees, on large horizontal limbs, and were watched 24 hours a day. A newly hatched bird at one of these nests was carried off by a raven (Interagency Meeting Records, June 12, 1989). Thorne Bay Ranger District personnel collected data on a nesting stand on Prince of Wales Island in 1990. A marbled murrelet nest with egg shell fragments was discovered and photographed on the east ridge of 12-Mile Arm (Craig Ranger District, Prince of Wales Island), August 19, 1992. Egg shell fragments were found on the ground at two other locations; west ridge 12-Mile Arm and Old-Franks (Craig Ranger District, Prince of Wales Island), but nests were not located. A nestling

marbled murrelet was found on the road at the east end of Neck Lake (northern part of the Prince of Wales Island), and another young marbled murrelet was seen on the ground north of El Capitan (northern part of Prince of Wales Island).

Old growth removal is not the only factor which may be influencing murrelet populations; other known factors include oil spills, predation, and commercial fishing (murrelets are caught in fishing nets). Mendenhall (1992) estimated the marbled murrelet population for Southeast Alaska ranged from 75,000 to 150,000 during the summer, based on surveys by M. McAllister from 1981-1988.

Effects of North Revilla Proposed Action on Population or Habitat

No nesting sites for marbled murrelets have been identified within the Project Area, although it is assumed that they nest in suitable habitats.

Since all inland forest stands on the Tongass National Forest are less than 25 miles from salt water, all could be potential marbled murrelet nesting habitat (USDI Fish and Wildlife Service 1992). However, these birds more commonly occupy larger stands (greater than 500 acres) than smaller stands (less than 100 acres) in California; marbled murrelets are usually absent from stands less than 60 acres in size (Paton and Ralph 1988, Ralph et al. 1990). Without precise knowledge to delineate the differences, all old-growth habitat greater than 8 MBF/acre is assumed to be suitable for nesting.

All action alternatives will harvest stands which may be capable of providing nesting habitat (old-growth forests) for marbled murrelets. Table 3 shows that Alternative 2 harvests fifteen percent, Alternative 3 harvests ten percent, Alternatives 4, and 6 harvest twelve percent and Alternative 5 harvests thirteen percent of the old-growth habitat in the Project Area, leaving at least 48,339 acres of old-growth unharvested.

In areas with timber harvesting, the amount of nesting habitat for marbled murrelets will be reduced. The amount of old-growth currently being used by marbled murrelets is unknown. The factors currently limiting marbled murrelets in Southeast Alaska have not been identified. Due to the amount of unknowns associated with marbled murrelets, it is not known what the actual effects of timber harvest will be, other than the total amount of habitat is reduced.

If the current population assumptions found in the Distribution and Population section are correct, and if it is assumed that nesting habitat is the limiting factor for the population, then a reduction in nesting habitat may have a proportional effect on the population. If so, then after a fifteen percent reduction in potential nesting habitat (Table 2), the North Revilla Project Area may still support 1,200 or more birds. This assumes no influence caused by fragmentation or increased edge, and a uniform use of the available, suitable habitat.

In summary, the North Revilla Project may effect marbled murrelets, but the extent of this effect is unknown.

Table 2
Acres and Percent of Wildlife Habitats Proposed for Harvest, by Alternative

Habitat	Existing Acres	Alt. 1		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6	
		Acres Cut	% Chg	Acres Cut	% Chg	Acres Cut	% Chg	Acres Cut	% Chg	Acres Cut	% Chg	Acres Cut	% Chg
Old Growth	56,927	0	0	8,585	15	5,769	10	6,884	12	7,168	13	6,676	12
Alpine/subalp.	16,971	0	0	120	1	60	<1	60	<1	80	<1	60	<1

SOURCE: Matson 1992. Data derived from GIS data base.

Murrelet nests are exceedingly difficult to find, and no intensive nest searches in North Revilla units are planned. However, if any nests are discovered, they will be protected by a minimum 600 foot buffer around the nest tree is proposed in the North Revilla FEIS. If research, monitoring, or administrative studies uncover new information addressing murrelets in Southeast Alaska, they will be reviewed for use in and/or replacement of this guideline. Draft 1991 Interim Management Guidelines For Marbled Murrelet Habitat Conservation in Washington, Oregon and California (where the marbled murrelet is listed as Threatened) calls for maintaining all contiguous suitable habitat in stands less than 480 acres where murrelet occupancy during the breeding season is demonstrated.

NORTHERN GOSHAWK (*Accipiter gentilis laingi*)

Distribution and Population

The American Ornithologists Union (AOU) recognizes two subspecies of the northern goshawk in North America, *Accipiter gentilis atricapillus* and *A.g. laingi*, the Queen Charlotte goshawk (AOU 1957). Taverner (1940) first described the darker plumaged Queen Charlotte goshawk as a distinct race occurring in the coastal temperate rainforests of the Queen Charlotte Islands and Vancouver Island, British Columbia. Webster (1988) found that the Queen Charlotte goshawk occurred from Vancouver Island north to the Taku River near Juneau.

As of December, 1991, the Alaska Region Status Report for USDA Region 10 Sensitive Species Consideration, stated, "The two factors causing concern for the goshawk in southeast Alaska are: low current population numbers and potential declines in habitat capability. Both factors expose the Queen Charlotte Goshawk to increased susceptibility to local or widespread extirpation. A review of goshawk observations during the past decade has revealed 16 confirmed or probable nesting sites in southeast Alaska." There was a high association between goshawk nesting stands and higher volume/tree size stands: 8 (50%) of the 16 sites were clearcut or planned for timber harvest until the goshawk nests were found" (Iverson unpubl. rep.). However no systematic Regional inventories have been conducted to confirm the relationship between nesting stands and higher volume tree stands.

The goshawk is a wide-ranging forest raptor that generally occurs in low densities, from 2.4 pair (Central Alaska, McGowan 1975) to 11.0 pair (Arizona, Crocker-Bedford and Chaney 1988) per 100 square kilometers, although population densities in Southeast Alaska may be much lower (Crocker-Bedford 1992). Home ranges have been reported to be 5,000 to 6,000 acres (Reynolds 1983). These home ranges may include a mosaic of habitat types, with a strong preference for mature forest with flight space beneath the canopy (Reynolds 1989, USDA Forest Service 1990). Home range size is strongly dependent upon quality of the foraging habitat and prey availability (Kenward 1982).

Goshawks generally select forest stands with large trees on gentle slopes at lower elevations for nesting and foraging (Reynolds 1989, USDA Forest Service 1990). Goshawk sensitivity to timber harvest has resulted in management recommendations to protect nest site integrity (Reynolds et al. 1982, Reynolds 1983, Crocker-Bedford and Chaney 1988, Fowler 1988, Kennedy 1988, USDA Forest Service 1990, USDA Forest Service 1991, USDA Forest Service Alaska Region 1992). Other management recommendations recognized the importance of the foraging area within the post-fledging area (Woodbridge et al. 1988, Kennedy 1989, Crocker-Bedford 1990b, USDA Forest Service 1991, USF&W letter of Sept. 5, 1991, USF&W letter of Aug. 13, 1992, and USDA Forest Service Alaska Region 1992). There is now widespread recognition of the importance of most foraging habitat, including areas far from the nesting site (Reynolds and Meslew 1984, Reynolds 1989, McCarthy et al. 1989, USDA Forest Service 1990, Crocker-Bedford 1990b, Crocker-Bedford 1991, Hargis et al. 1991, Patla 1991, USF&W Service letter of Sept. 5, 1991, USF&W Service Letter of Aug. 13, 1992, Reynolds et al. 1991, Crocker-Bedford 1992, USDA Forest Service 1992, Ward et al. 1992, Marshall 1992).

inventories were conducted in the Shrimp Bay, Traitors Cove, Hassler Island, and the Margaret areas from 1990 through 1992. No known goshawk nests have been found, however, two confirmed sightings were made above the Margaret watershed in 1990 (Crocker-Bedford, 1990)

In 1991 the Ketchikan Area awarded a Sikes Act Contract to the ADF&G to inventory and study goshawks. While most of the areas surveyed were on Prince of Wales Island and Cleveland Peninsula, several areas within and close to the North Revilla Project Area were surveyed. This included the area around Orchard Lake, Naha Bay and Leask Lake. Sixteen biologist days were spent surveying these areas, with one unconfirmed vocal northern goshawk response to a tape recording.

During 1992, Forest Service and ADF&G biologists spent 8 biologist days searching for goshawks in the Hassler Island, Klu Bay, and Orchard Lake area. No goshawks or nest were found, but there was a possible (unconfirmed) goshawk vocal response to distress calls broadcast from a boat on Hassler Pass (ADF&G 1992 Goshawk Survey Progress Report). Although the inventory techniques were among the best available, there is a high likelihood that nests were missed even in the stands that were sampled (Kimmel, J. T. and R. H. Yahner 1990; Kennedy et al., in press; and ADF&G 1992 Goshawk Survey Progress Report). Any pairs of goshawks missed to date will not be protected unless chance observations are made during the timber sale layout process.

On August 18, 1992, the Alaska Region issued Interim Management Guidelines for the goshawk on the Tongass National Forest. A review and evaluation of the guidelines will occur. All units laid out for the Final EIS will follow the management guidelines for goshawks in effect at the time of layout.

Effects of North Revilla Proposed Action on Population or Habitat

Any pairs of goshawks not discovered prior to timber harvest may be affected if the harvest units correspond to key stands of habitat. Any goshawk nest found prior to harvest will be protected utilizing the current goshawk management guidelines, which normally provide more careful management only within the post fledging area. Therefore, the North Revilla Project may effect northern goshawks.

HARLEQUIN DUCK (*Histrionicus histrionicus*)

Distribution and Population

The harlequin duck's range is divided into two separate and distinct regions: eastern and western. The eastern range embraces Iceland, parts of Greenland, and Labrador, with the winter range extending as far south as New Jersey. The western range includes northeast Siberia west to the Lena River, east to the Kamchatka Peninsula and the Commander Islands and north to the Arctic Circle, then across the Bering Sea to the Aleutian Islands, much of interior Alaska, and south to northwest Wyoming and central California (Bellrose 1976). For Alaska, the harlequin duck has been reported as a fairly common year-round resident, and at one season or another, has been recorded over much of the State, except the Arctic coast (Gabrielson and Lincoln 1959).

Available evidence indicates that the species breeds locally over much of southern Alaska, probably the Aleutians, and north to Anaktuvuk Pass. All ornithologists who have worked during the spring and summer

months in the Alexander Archipelago and other parts of Southeast Alaska, have commented upon the numbers of these ducks, frequently summarizing their observations by stating that they were common or abundant (Gabrielson and Lincoln 1959).

Harlequins nest along inland rivers and streams. Usually the nest site is usually 6 feet (but up to 60 feet) from water (DeGraff et al. 1991). The site chosen usually has shelter overhead - a recess in a stream bank, or among rocks, or under shrubs, trees, or stranded debris. Occasionally the nest is in an open area, but under shrubbery of other low vegetation, or even on a stream bar. There is no proof that harlequins nest in tree cavities (Bellrose 1976; Armstrong et al. 1983; Kortright 1962; Godfrey 1979; Palmer 1975). During the winter the harlequin duck is common to abundant in the coastal waters of Southeast Alaska, Prince William Sound, Cook Inlet, the bays of the Alaska Peninsula, the Aleutians and the Pribilofs (Gabrielson and Lincoln 1959). Preferred winter habitat is reported to be areas along surf-pounded rocky coasts -- not in sheltered bays and fjords, but instead where water is one to two fathoms deep and turbulent, and where bottom fauna abounds (Palmer 1975).

Effects on Population or Habitat

Nesting habitat for the harlequin duck occurs along inland rivers and streams. Riparian habitats along all rivers and streams on the Forest will be managed according to the Stream and Lake Protection management prescription or a more restrictive management prescription (such as when a stream or river is in a Wilderness Area). The Stream and Lake Protection Management Prescription is on pages 3-180 to 3-205 of the TLMP Revision SDEIS Proposed Revised Forest Plan and have been adopted by the North Revilla Project. Nesting habitat requirements are expected to be maintained and since winter habitat occurs in the marine environment, in areas of high surf and rocky beaches, no effect on harlequin ducks is anticipated with any alternatives of the North Revilla Project.

SPOTTED FROG (*Rana pretiosa*)

Distribution and Population

The spotted frog occurs in or near fresh water and is believed to range south from the Taku river, other transboundary rivers and some islands of Southeast Alaska and British Columbia (Holmberg, April 17, 1992). Spotted frogs have been documented in the Stikine River basin (Waters 1992). Presence of spotted frogs on Revillagigedo Island has not been confirmed. Four biologist days were spent looking for spotted frogs within the Project Area, but none were found.

Effects of North Revilla Proposed Action on Population or Habitat

Riparian habitats along all lakes, rivers and streams on the Forest will be managed according to the Stream and Lake Protection management prescription or a more restrictive management prescription (such as when a stream or river is in a Wilderness Area). The Stream and Lake Protection Management Prescription is on pages 3-180 to 3-205 of the TLMP Revision SDEIS and have been adopted by the North Revilla Project. With implementation of Stream and Lake Management Prescriptions, no effects on the spotted frog is anticipated by the North Revilla Project, even if they are found to occur within the Project Area.

CANDIDATE (Category 2) PLANT SPECIES

Aster yukonensis

This taxon is known from an area near Bettles, north of the Yukon River, and from the north side (continental side) of the St. Elias Range, north of Yakutat (Murray and Lipkin 1987). The plant would not be expected to occur in the Project Area (DeMeo 1992).

Since this species is not known to occur in the Project Area, there are no anticipated effects of the North Revilla proposed action on population or habitat of *Aster yukonensis* (DeMeo 1992).

Calamagrostis crassiglumis

Disjunct populations of this grass are known along the Pacific coast from Kodiak Island south to northern California. The plant grows in marshy wet areas, muddy areas near lakes, beach meadows, and rocky soil. This plant does not grow in muskeg habitats (Muller 1991). Based on collections in Alaska and British Columbia, the plant may be found in the Project Area.

This species is not known to occur in forested areas; therefore, no direct effects from timber harvest are anticipated. Changes in drainage due to roading or other activities may affect habitat and populations of the plant (DeMeo 1992). Stream, estuary, and lakeshore buffers should provide adequate protection for this plant.

Carex lenticularis var. dolia

This sedge is known to be in the coastal mountains of southern Alaska and may be expected to occur in the Project Area (DeMeo 1992).

This species is not known to occur in forested areas; therefore, there are no effects anticipated from timber harvest (DeMeo 1992).

Montia bostockii

This small herb occurs in alpine and subalpine meadows in the Brooks Range through the Wrangell-St. Elias Range (Muller 1991). It would not be expected to occur in the Project Area.

Since *Montia bostockii* is not known to occur in the Project Area, there are no effects anticipated from North Revilla timber harvest activities (DeMeo 1992).

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DOCUMENTATION OF CORRESPONDENCE WITH OTHER AGENCIES

June 5, 1987:	U.S. Fish and Wildlife Service memorandum, recommended changing the Prince of Wales flying squirrel from a Category 2 candidate species to a Category 3c candidate species.
Dec. 4, 1990:	NMFS publishes final rule in the Federal Register listing the Steller sea lion as a threatened species.
March 20, 1991:	Interagency Wildlife Technical Committee Meeting.
April 2-4, 1991:	Marbled murrelet workshop sponsored by the USFWS.
Sept. 5, 1991:	USF&W letter critique of USDA Forest Service Region 3 Management Guidelines for the Northern Goshawk in the Southwestern Region, (56 FR 122, 28853).
Dec. 17, 1991:	Status report on R10 sensitive species candidates.
Jan. 28, 1992:	Forest Service letter to NMFS requesting list of T & E species in proposed project areas.
Feb. 6, 1992:	NMFS letter listing humpback whale and Steller sea lion as being within the central Prince of Wales project area.
March 5, 1992:	Letter from USFWS concerning T & E in Lab Bay, Prince of Wales, Polk and Revilla timber sale areas.
April 8, 1992:	Phone conversation with NMFS about the status of recovery plans for whales and the Steller sea lion, and proposed regulations for approaching marine mammals.
April 8, 1992:	Letter to USFWS requesting updated list of T & E and proposed and candidate species.
April 9, 1992:	Phone conversation with the Alaska Natural Heritage Program to check on any changes in the listing of candidate plants.
April 15, 1992:	Letter from USFWS updating the list of threatened, endangered, and candidate species likely to occur on the Forest.
April 17, 1992:	Phone conversation with the USFWS clarifying that the Aleutian Canada goose is not likely to occur on the Forest.
June 24, 1992:	USDA Forest Service memo describing current status of goshawk call survey.
Aug. 13, 1992:	USF&W letter critique of USDA Forest Service Region 3 Management Guideline Revision for the Northern Goshawk in the Southwestern Region, (57 FR 119, 27424).
Aug. 18, 1992:	Interim habitat recommendations for the northern goshawk, USDA Forest Service, Alaska Region, Juneau.



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
Ecological Services Juneau
Southeast Alaska Ecological Services
P.O. Box 021287
Juneau, Alaska 99802-1287
(907) 586-7240

Take-Hank-Rock
TAKE
PRIDE IN
AMERICA

RECEIVED

FOREST SUPERVISORS OFFICE

April 28, 1993

David D. Rittenhouse
Forest Supervisor
Ketchikan Area
Tongass National Forest
Federal Building
Ketchikan, AK 99901

4/30/93
TONGASS NF
KETCHIKAN, AK 99901

Dear Mr. Rittenhouse:

The U.S. Fish and Wildlife Service (Service) has reviewed the March 30, 1993 biological assessment for threatened and endangered species that may occur in the North Revilla timber sale area. The assessment evaluated the effects of proposed actions on the following species:

Common Name	Scientific Name	ESA Status
American peregrine falcon	<u>Falco peregrinus anatum</u>	endangered
arctic peregrine falcon	<u>Falco peregrinus tundris</u>	threatened
Aleutian Canada goose	<u>Branta canadensis leucopareia</u>	threatened
eskimo curlew	<u>Numenius borealis</u>	endangered

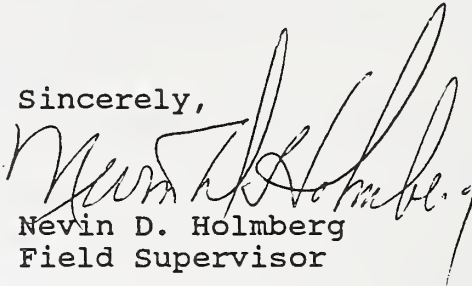
Based on the analysis contained in the North Revilla biological assessment, the Forest Service concluded that the proposed project will not affect listed species that may occur in the project area. For the purposes of Section 7 of the Endangered Species Act, we concur that the proposed project would not likely adversely affect currently listed threatened or endangered species. Accordingly, no incidental take is authorized.

The North Revilla biological assessment also discussed potential effects on several Category 2 candidate species. The Service continues to encourage the Forest Service to address these species in the development and implementation of management actions, is very pleased that you have done so in this case.

We provided comments about Category 2 candidate species in a letter to you dated April 9, 1993 regarding the Central Prince of Wales (CPOW) biological assessment. While the Revilla timber sale area represents a different geographic area, the extent of timber cutting on Revillagigedo Island is substantial. Many of the same issues apply. We refer you to our general comments concerning candidate species contained in our (4/9/93) CPOW letter.

These comments are offered for endangered and threatened species for which the U.S. Fish and Wildlife Service has responsibility under Section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1521 et seq.) and its amendments. The above comments are specific to the Endangered Species Act and do not reflect agency concerns regarding other organisms or habitats for which the Service has legislated responsibilities.

Sincerely,

A handwritten signature in dark ink, appearing to read "Nevin D. Holmberg", written over the typed name and title.

Nevin D. Holmberg
Field Supervisor



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

National Marine Fisheries Service

P.O. Box 21668

Juneau, Alaska 99802-1668

April 14, 1993

RECEIVED

FOREST SUPERVISORS OFFICE

4/19/93
TONGASS NF

KETCHIKAN, AK 99901

David D. Rittenhouse
Forest Supervisor, Ketchikan Area
Tongass National Forest
USDA Forest Service
Federal Building
Ketchikan, Alaska 99901

Dear Mr. Rittenhouse:

Thank you for your recent letter containing the Biological Assessment (BA) for the North Revilla timber sale. The BA evaluates the potential for effects to humpback whales and Steller sea lions as a result of harvesting timber, constructing roads, using six existing log transfer facilities, and constructing up to three new log transfer facilities. You have determined that the proposed actions, mitigated by the Tongass Forest Plan Revision Forest-wide Standards and Guidelines that limit vessel and aircraft proximity to marine mammals, are not likely to affect these listed species.

We concur with your conclusion that the proposed actions are not likely to affect endangered or threatened species within our purview. This concludes Section 7 consultation requirements for the North Revilla timber sale area. If new information or circumstances arise that could cause us to alter this determination, consultation pursuant to Section 7 of the ESA should be reinitiated. For further coordination regarding Section 7 consultation, contact Tamra Faris at (907) 586-7235.

Sincerely,

Steven Pennoyer
Director, Alaska Region



Appendix E

Transportation

APPENDIX E

Transportation Facilities

Traffic Service Levels

The U.S. Forest Service operates an extensive road system throughout the United States. The agency developed a concept describing significant traffic characteristics and operating conditions. These "traffic service levels" are used in setting maintenance levels throughout the National Forest System.

	A	B	C	D
FLOW	Free flowing with adequate passing facilities.	Congested during heavy traffic such as during peak logging or recreation activities.	Interrupted by limited passing facilities or slowed by the road condition.	Flow is slow or may be blocked by an activity. Two-way traffic is difficult and may require backing to.
VOLUMES	Uncontrolled: will accommodate the expected traffic volumes.	Occasionally controlled during heavy use periods.	Erratic: frequently controlled as the capacity is reached.	Intermittent and usually controlled. Volume is limited to that associated with the single purpose.
VEHICLE TYPES	Mixed: includes the critical vehicle and all vehicles normally found on public roads.	Mixed: includes the critical vehicle and all vehicles normally found on public roads.	Controlled mix: accommodates all vehicle types including the critical vehicle. Some use may be controlled to minimize conflicts between vehicle types.	Single Use: not designed for mixed traffic. Some vehicles may not be able to negotiate. Concurrent uses between commercial and other traffic is restricted.
CRITICAL VEHICLE	Clearances are adequate to allow free travel. Overload permits are required.	Traffic controls needed where clearances are marginal. Overload	Special provisions may be needed. Some vehicles will have difficulty negotiating	Some vehicles may not be able to negotiate. Loads may have to be off-loaded and walked in.
SAFETY	Safety features are a part of the design.	High priority in design. Some protection is accomplished by	Most protection is provided by traffic management.	The need for protection is minimized by low speeds and strict traffic controls.
MANAGEMENT TRAFFIC	Normally limited to regulatory, warning, and guide signs and permits.	Employed to reduce traffic volume and conflicts.	Traffic controls are frequently needed during periods of high use by the dominant	Used to discourage or prohibit traffic other than that associated with the single purposes.
USER COSTS	Minimize: transportation efficiency is important.	Generally higher than "A" because of slower speeds and increased delays.	Not important: efficiency of travel may be traded for lower construction costs.	Not considered.
ALIGNMENT	Design speed is the predominant factor within feasible topographic limitations.	Influenced more strongly by topography than by speed and efficiency.	Generally dictated by topographic features and environmental factors. Design speeds are generally low.	Dictated by topography environmental factors, and the design and critical vehicle limitations. Speed is not important.
ROAD SURFACE	Stable and smooth with little or no dust, considering the normal season of use.	Stable for the predominant traffic for the normal use season. Periodic dust control for heavy use or environmental reasons. Smoothness is commensurate with the design speed.	May not be stable under all traffic or weather conditions during the normal use season. Surface rutting, roughness, and dust may be present, but controlled for environmental or investment protections.	Rough and irregular. Travel with low clearance vehicles is difficult. Stable during dry conditions. Rutting and dusting controlled only for soil and water protection.

Road Development

Table A-1 displays the existing and proposed roads by VCU, miles, and clearing acres for each alternative including the Total Rotation (2140). Discrepancies may be found within tables due to rounding.

Table A-1
Existing and New Roads

Alternative 2

VCU	Existing Roads		Proposed Roads		Total Development	
	Miles	Acres	Miles	Acres	Miles	Acres
732	0.0	0	7.0	63	7.0	63
733	6.7	61	15.6	141	22.3	202
735	1.8	16	15.3	139	17.1	155
736	7.8	71	16.7	152	24.5	223
737	10.2	93	24.0	219	34.2	312
738	18.9	172	37.7	343	56.6	515
739	22.6	206	34.8	316	57.4	522
740	0.0	0	2.4	22	2.4	22
Total	68.1	619	153.4	1,395	221.5	2,014

Alternative 3

VCU	Existing Roads		Proposed Roads		Total Development	
	Miles	Acres	Miles	Acres	Miles	Acres
732	0.0	0	0.0	0	0.0	0
733	5.7	52	10.6	96	16.3	148
735	1.9	17	11.0	100	12.9	117
736	5.8	52	14.5	132	20.3	184
737	3.3	30	7.4	67	10.7	97
738	14.9	136	29.5	268	44.4	404
739	19.2	174	29.5	268	48.6	442
740	0.0	0	0.6	5	0.6	5
Total	50.7	461	103.0	937	153.7	1,397

Alternative 4

VCU	Existing Roads		Proposed Roads		Total Development	
	Miles	Acres	Miles	Acres	Miles	Acres
732	0.0	0	0.0	0	0.0	0
733	6.7	61	12.5	114	19.2	175
735	1.8	16	14.1	128	15.9	144
736	3.4	31	13.6	123	17.0	154
737	10.2	93	26.6	242	36.8	335
738	14.9	135	16.7	152	31.6	287
739	4.9	45	8.4	76	13.3	121
740	0.0	0	2.9	26	2.9	26
Total	42.0	381	94.8	861	136.7	1,242

Alternative 5

VCU	Existing Roads		Proposed Roads		Total Development	
	Miles	Acres	Miles	Acres	Miles	Acres
732	0.0	0	6.6	60	6.6	60
733	6.7	61	14.6	133	21.3	194
735	1.8	16	8.9	81	10.7	97
736	8.0	72	17.5	159	25.5	231
737	10.6	96	29.3	266	39.9	362
738	15.0	137	32.7	298	47.7	435
739	16.5	150	24.0	218	40.5	368
740	0.0	0	2.9	26	2.9	26
Total	58.6	533	136.5	1,241	195.1	1,774

Alternative 6

VCU	Existing Roads		Proposed Roads		Total Development	
	Miles	Acres	Miles	Acres	Miles	Acres
732	0.0	0	0.0	0	0.0	0
733	6.5	59	11.7	106	18.2	165
735	1.9	17	11.3	103	13.2	120
736	6.1	56	13.2	120	19.3	176
737	3.3	30	8.0	72	11.3	102
738	17.1	156	28.7	261	45.8	417
739	16.9	154	24.3	221	41.2	375
740	0.0	0	0.6	6	0.6	6
Total	51.9	472	97.7	889	149.6	1,361

Total Rotation (2140)

VCU	Existing Roads		Proposed Roads		Total Development	
	Miles	Acres	Miles	Acres	Miles	Acres
732	0.0	0	9.3	84	9.3	84
733	8.3	75	20.1	183	28.4	258
735	2.1	19	21.6	196	23.7	215
736	13.6	124	33.8	307	47.4	431
737	14.0	127	45.9	418	59.9	545
738	27.8	253	60.9	554	88.7	807
739	26.9	245	59.9	544	86.8	789
740	13.2	120	16.6	151	29.8	271
Total	105.9	963	268.0	2,437	373.9	3,400

Coordination of Construction With Fish and Wildlife

Table A-2 displays existing, proposed reconstructed and new road development within the 1/2 mile eagle disturbance zone by VCU for each alternative including total rotation (2140).

There are 1,260 feet of planned roads within a 330 foot radius of an eagle tree in Alternatives 2, 3, 5, and 6, with 660 feet of planned roads in Alternative 4. By the year 2140, (in total rotation), 1,420 feet of planned road will be within 330 feet of eagle trees.

Existing roads include those that need reconstruction.

Table A-2
Eagle Disturbance Zones

Alternative 2

VCU	Existing		Reconstruction		Planned	
	Feet*	Acres	Feet*	Acres	Feet*	Acres
732	0	0	0	0	0	0
733	0	0	0	0	0	0
735	7,820	13	5,300	9	21,750	37
736	5,960	10	1,930	3	25,450	44
737	7,310	13	7,200	12	7,880	14
738	16,420	28	4,030	7	22,980	40
739	3,110	5	0	0	16,360	28
740	0	0	0	0	0	0
Total	40,620	70	18,460	32	94,420	163
Miles	7.7		3.5		17.9	

Alternative 3

VCU	Existing		Reconstruction		Planned	
	Feet*	Acres	Feet*	Acres	Feet*	Acres
732	0	0	0	0	0	0
733	0	0	0	0	0	0
735	8,340	14	5,820	10	16,080	28
736	7,170	12	3,140	5	23,960	41
737	6,970	12	6,860	12	5,050	9
738	17,200	30	3,440	6	18,230	31
739	920	2	0	0	12,750	22
740	0	0	0	0	0	0
Total	40,600	70	19,260	33	76,070	131
Miles	7.7		3.6		14.4	

Alternative 4

VCU	Existing		Reconstruction		Planned	
	Feet*	Acres	Feet*	Acres	Feet*	Acres
732	0	0	0	0	0	0
733	0	0	0	0	0	0
735	7,820	13	5,310	9	18,630	32
736	2,610	4	2,610	4	20,790	36
737	7,310	13	6,900	12	10,860	19
738	18,530	32	3,440	5	4,230	7
739	0	0	0	0	0	0
740	0	0	0	0	0	0
Total	36,270	62	18,260	31	54,510	94
Miles	6.9		3.5		10.3	

Alternative 5

VCU	Existing		Reconstruction		Planned	
	Feet*	Acres	Feet*	Acres	Feet*	Acres
732	0	0	0	0	0	0
733	0	0	0	0	0	0
735	7,820	13	5,300	9	16,720	29
736	6,630	11	2,610	4	20,490	35
737	7,390	13	7,200	12	12,250	21
738	16,420	28	4,020	7	22,870	39
739	0	0	0	0	10,460	18
740	0	0	0	0	0	0
Total	38,260	66	19,130	33	82,790	143
Miles	7.2		3.6		15.7	

Alternative 6

VCU	Existing		Reconstruction		Planned	
	Feet*	Acres	Feet*	Acres	Feet*	Acres
732	0	0	0	0	0	0
733	0	0	0	0	0	0
735	8,340	14	5,820	10	16,080	28
736	5,960	10	1,930	3	22,040	38
737	6,970	12	6,860	12	5,050	9
738	17,200	30	3,440	6	19,560	34
739	0	0	0	0	8,120	14
740	0	0	0	0	0	0
Total	38,470	66	18,050	31	70,850	122
Miles	7.3		3.4		13.4	

Total Rotation (2140)

(There are 160' of planned road within 330' of an eagle tree in VCU 739, 660' of planned road within 330' of an eagle tree in VCU 735, and 660' of planned road within 330' of an eagle tree in VCU 738. The other VCU's have no roads in the 330' zone.)

VCU	Existing		Reconstruction		Planned	
	Feet*	Acres	Feet*	Acres	Feet*	Acres
732	0	0	0	0	0	0
733	0	0	0	0	0	0
735	8,930	15	6,410	11	34,480	59
736	17,520	30	3,140	5	37,750	65
737	8,300	14	6,860	12	18,900	33
738	31,050	53	4,020	7	38,030	65
739	5,280	9	0	0	30,830	53
740	14,970	26	0	0	24,310	42
Total	86,050	148	20,430	35	184,300	317
Miles	16.3		3.9		34.9	

* Linear feet

Table A-3 displays identified RP stream crossings by VCU and stream classification for each alternative.

Table A-3
Identified RP Stream Crossings

Alternative 2

VCU	I	II	III	Total
732	1	3	5	9
733	5	10	8	23
735	4	7	17	28
736	5	2	25	32
737	10	6	30	46
738	6	10	74	90
739	13	26	57	96
740	0	0	3	3
Total	44	64	219	

Alternative 3

VCU	I	II	III	Total
732	0	0	0	0
733	4	9	3	16
735	3	6	13	22
736	7	7	18	32
737	0	2	4	6
738	2	7	58	67
739	12	23	49	84
740	0	0	2	2
Total	28	54	147	

Alternative 4

VCU	I	II	III	Total
732	0	0	0	0
733	4	10	5	19
735	5	6	15	26
736	3	2	21	26
737	11	6	32	49
738	3	5	30	38
739	3	4	9	16
740	0	0	4	4
Total	29	33	116	

Alternative 5

VCU	I	II	III	Total
732	1	2	7	10
733	5	9	4	18
735	3	5	8	16
736	4	3	28	35
737	15	6	35	56
738	2	10	58	70
739	12	20	42	74
740	0	0	4	4
Total	42	55	186	

Alternative 6

VCU	I	II	III	Total
732	0	0	0	0
733	5	9	3	17
735	3	6	13	22
736	6	4	16	26
737	0	2	5	7
738	3	7	54	64
739	10	21	32	63
740	0	0	1	1
Total	27	49	124	

Total Rotation (2140)

VCU	I	II	III	Total
732	1	3	10	14
733	5	8	9	22
735	6	8	20	34
736	7	4	43	54
737	18	8	45	71
738	7	14	102	123
739	17	30	98	145
740	1	0	19	20
Total	62	75	346	

Table A-4 portrays the identified fish timing, passage, and non-passage by alternative and VCU.

Table A-4
Identified Fish Timing, Passage and Non-passage

Alternative 2

VCU	Timing	Passage	Non-passage
732	0	4	5
733	5	15	8
735	4	11	17
736	6	7	25
737	5	16	30
738	9	15	74
739	8	38	57
740	0	0	3
Total	37	106	219

Alternative 3

VCU	Timing	Passage	Non-passage
732	0	0	0
733	4	13	3
735	3	9	13
736	7	10	18
737	0	2	4
738	4	9	58
739	6	34	50
740	0	0	2
Total	24	77	148

Alternative 4

VCU	Timing	Passage	Non-passage
732	0	0	0
733	4	14	5
735	5	11	15
736	3	5	21
737	6	23	32
738	5	8	30
739	3	7	9
740	0	0	4
Total	26	68	116

Alternative 5

VCU	Timing	Passage	Non-passage
732	0	3	9
733	5	14	4
735	3	9	8
736	5	7	28
737	8	23	35
738	4	12	58
739	5	31	25
740	0	0	4
Total	30	99	171

Alternative 6

VCU	Timing	Passage	Non-passage
732	0	0	0
733	5	14	3
735	4	8	13
736	7	10	16
737	0	2	5
738	5	10	54
739	5	31	39
740	0	0	1
Total	26	75	131

Total Rotation (2140)

VCU	Timing	Passage	Non-passage
732	0	4	10
733	5	14	8
735	6	14	20
736	8	11	43
737	7	26	45
738	11	21	102
739	9	46	99
740	1	1	19
Total	47	137	346

TTRA and RP Prescription Zones

Tables A-5 thru A-11 display the existing and planned roads within the various TTRA and RP prescription zones for each alternative. The zones are as follows:

TTRA Stream Zones (Tongass Timber Reform Act)
 TTRA Lake Zones (Tongass Timber Reform Act)
 RP Lake Prescription Zone (TLMP Revision)
 Estuarine Prescription Zone (Beach Fringe and Estuarine Prescription, TLMP Revision)
 Beach Fringe Prescription Zone (Beach Fringe and Estuarine Prescription, TLMP Revision)
 RP Stream Prescription Zone (No Cut) (TLMP Revision)
 RP Stream Prescription Zone (Partial Cut) (TLMP Revision)

Table A-5 displays the existing and planned roads within the TTRA Stream Buffer by VCU, road segment in miles, and clearing limit acreage for each alternative.

Table A-5

Planned and Existing Roads in the TTRA Stream Zone

Alternative 2

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	820	1
733	5,510	9	170	1
735	140	1	1,980	3
736	0	0	560	1
737	2,820	5	1,360	2
738	5,970	10	1,870	3
739	2,890	5	1,150	2
740	0	0	0	0
Total	17,330	30	7,910	14
Miles	3.3		1.5	

Alternative 3

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,730	5	80	1
735	140	1	980	2
736	0	0	650	1
737	0	0	670	1
738	1,330	2	930	2
739	2,730	5	1,140	2
740	0	0	0	0
Total	6,930	12	4,450	8
Miles	1.3		0.8	

Alternative 4

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	5,780	10	90	1
735	140	1	1,790	3
736	0	0	0	0
737	2,830	5	1,690	3
738	1,580	3	410	1
739	0	0	0	0
740	0	0	0	0
Total	10,330	18	3,980	7
Miles	2.0		0.8	

Alternative 5

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	820	1
733	5,510	9	170	1
735	140	1	980	2
736	0	0	140	1
737	2,820	5	1,360	2
738	1,600	3	980	2
739	2,000	3	1,160	2
740	0	0	0	0
Total	12,070	21	5,610	10
Miles	2.3		1.1	

Alternative 6

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	5,510	9	170	1
735	140	1	980	2
736	0	0	650	1
737	0	0	670	1
738	5,140	9	1,710	3
739	2,000	3	1,150	2
740	0	0	0	0
Total	12,790	22	5,330	9
Miles	2.4		1.0	

Total Rotation (2140)

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	820	1
733	7,570	13	230	1
735	600	1	2,490	4
736	470	1	650	1
737	2,980	5	2,410	4
738	6,140	11	2,010	3
739	3,360	6	1,860	3
740	7,440	13	380	1
Total	28,560	50	10,850	18
Miles	5.4		2.1	

Table A-6 displays the existing and planned roads within the TTRA Lake Zone by VCU, road segment in miles, and clearing limit acreage for each alternative.

Table A-6
Planned and Existing Roads in the TTRA Lake Zone

Alternative 2

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	220	1
733	0	0	140	1
735	0	0	490	1
736	0	0	0	0
737	0	0	0	0
738	330	1	0	0
739	0	0	0	0
740	0	0	0	0
Total	330	1	850	1
Miles	0.1		0.2	

Alternative 3

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	0	0	0	0
735	0	0	490	1
736	0	0	0	0
737	0	0	0	0
738	90	1	0	0
739	0	0	0	0
740	0	0	0	0
Total	90	1	490	1
Miles	0.1		0.1	

Alternative 4

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	0	0	0	0
735	0	0	490	1
736	0	0	0	0
737	0	0	0	0
738	0	0	0	0
739	0	0	0	0
740	0	0	0	0
Total	0	0	490	1
Miles	0.0		0.1	

Alternative 5

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	220	1
733	0	0	140	1
735	0	0	490	1
736	0	0	0	0
737	0	0	0	0
738	0	0	0	0
739	0	0	0	0
740	0	0	0	0
Total	0	0	850	1
Miles	0.0		0.2	

Alternative 6

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	0	0	0	0
735	0	0	490	1
736	0	0	0	0
737	0	0	0	0
738	0	0	0	0
739	0	0	0	0
740	0	0	0	0
Total	0	0	490	1
Miles	0.0		0.1	

Total Rotation (2140)

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	220	1
733	0	0	140	1
735	0	0	490	1
736	0	0	0	0
737	140	1	340	1
738	380	1	0	0
739	0	0	0	0
740	180	1	0	0
Total	700	1	1,190	2
Miles	0.1		0.2	

Table A-7 displays the existing and planned roads within the RP Lake Prescription Zone by VCU, road segment in miles, and clearing limit acreage for each alternative.

Table A-7
Planned and Existing Roads in the RP Lake Prescription Zone

Alternative 2

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	11,650	20
733	1,400	2	4,580	8
735	0	0	3,370	6
736	0	0	3,230	6
737	3,360	6	0	2
738	935	2	1,440	2
739	6,450	11	830	1
740	0	0	0	0
Total	12,145	21	25,100	45
Miles	2.3		4.8	

Alternative 3

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	1,400	2	1,250	2
735	0	0	2,530	4
736	0	0	3,270	6
737	0	0	0	0
738	790	1	1,440	2
739	6,090	11	1,290	2
740	0	0	0	0
Total	8,280	14	9,780	16
Miles	1.6		1.8	

Alternative 4

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	1,400	2	1,200	2
735	0	0	2,510	4
736	0	0	3,230	6
737	3,070	5	0	0
738	710	1	0	0
739	3,680	6	1,290	2
740	0	0	0	0
Total	8,860	15	8,280	14
Miles	1.7		1.6	

Alternative 5

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	11,060	19
733	1,400	2	3,840	7
735	0	0	2,510	4
736	0	0	1,290	2
737	3,070	5	0	0
738	500	1	1,400	2
739	6,160	11	1,770	3
740	0	0	0	0
Total	11,130	19	21,870	38
Miles	2.1		4.1	

Alternative 6

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	1,400	2	1,250	2
735	0	0	2,510	4
736	0	0	3,230	6
737	0	0	0	0
738	710	1	0	0
739	5,020	8	1,290	2
740	0	0	0	0
Total	7,130	12	8,280	14
Miles	1.4		1.6	

Total Rotation (2140)

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	13,280	23
733	1,400	2	4,580	8
735	0	0	3,460	6
736	310	1	3,470	6
737	5,640	10	2,070	4
738	5,930	10	1,440	2
739	6,160	11	1,770	3
740	3,420	6	410	1
Total	22,860	40	30,480	53
Miles	4.3		5.8	

Table A-8 display the existing and planned roads within the Estuarine Prescription Zone by VCU, road segment in miles, and clearing limit acreage for each alternative.

Table A-8

Planned and Existing Roads in the Estuarine Prescription Zone

Alternative 2

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,440	4	160	1
735	780	1	4,840	8
736	0	0	0	0
737	3,270	6	1,520	3
738	4,590	8	600	1
739	0	0	3,430	6
740	0	0	0	0
Total	11,080	19	10,550	18
Miles	2.1		2.0	

Alternative 3

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,460	4	120	1
735	810	1	2,740	5
736	0	0	0	0
737	630	1	0	0
738	4,550	8	600	1
739	0	0	120	1
740	0	0	0	0
Total	8,450	14	3,580	6
Miles	1.6		0.7	

Alternative 4

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,440	4	160	1
735	780	1	3,850	7
736	0	0	0	0
737	3,160	5	1,440	2
738	4,550	8	0	0
739	0	0	0	0
740	0	0	0	0
Total	10,930	18	5,450	9
Miles	2.1		1.0	

Alternative 5

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,440	4	160	1
735	780	1	3,970	7
736	0	0	0	0
737	3,160	5	1,440	2
738	4,550	8	0	0
739	0	0	530	1
740	0	0	0	0
Total	10,930	18	6,100	10
Miles	2.1		1.2	

Alternative 6

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,440	4	160	1
735	780	1	2,740	5
736	0	0	0	0
737	630	1	0	0
738	4,550	8	600	1
739	0	0	120	1
740	0	0	0	0
Total	8,400	14	3,620	6
Miles	1.6		0.7	

Total Rotation (2140)

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,440	4	360	1
735	780	1	5,620	10
736	0	0	0	0
737	3,150	5	1,440	2
738	4,550	8	890	2
739	0	0	9,960	17
740	0	0	0	0
Total	10,920	18	18,270	32
Miles	2.1		3.5	

Table A-9 displays the existing and planned roads within the Beach Fringe Prescription Zone by VCU, road segment in miles, and clearing limit acreage for each alternative.

Table A-9

Planned and Existing Roads in the Beach Fringe Prescription Zone

Alternative 2

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	1,500	3	0	0
735	100	1	1,670	3
736	1,770	3	650	1
737	1,020	2	830	1
738	0	0	2,690	5
739	0	0	2,060	4
740	0	0	0	0
Total	4,390	8	7,900	14
Miles	0.8		1.5	

Alternative 3

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	1,500	3	0	0
735	100	1	1,670	3
736	1,770	3	990	2
737	660	1	0	0
738	0	0	2,690	5
739	0	0	1,860	3
740	0	0	0	0
Total	4,030	7	7,210	12
Miles	0.8		1.4	

Alternative 4

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	1,500	3	0	0
735	120	1	1,670	3
736	0	0	650	1
737	1,020	2	370	1
738	0	0	280	1
739	0	0	0	0
740	0	0	0	0
Total	2,640	5	2,970	5
Miles	0.5		0.6	

Alternative 5

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	1,500	3	0	0
735	120	1	1,670	3
736	1,770	3	650	1
737	1,020	2	370	1
738	0	0	2,410	4
739	0	0	2,070	4
740	0	0	0	0
Total	4,410	8	7,170	12
Miles	0.8		1.4	

Alternative 6

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	1,500	3	0	0
735	100	1	1,670	3
736	1,770	3	990	2
737	660	1	0	0
738	0	0	2,690	5
739	0	0	1,860	3
740	0	0	0	0
Total	4,030	7	7,210	12
Miles	0.8		1.4	

Total Rotation (2140)

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	1,500	3	0	0
735	120	1	2,380	4
736	3,840	7	4,730	8
737	1,360	2	830	1
738	5,420	9	7,480	13
739	0	0	2,060	4
740	880	2	0	0
Total	13,120	23	17,480	30
Miles	2.5		3.3	

Table A-10 displays the existing and planned roads within the RP Prescription zone (No Cut) by VCU, road segment in miles, and clearing limit acreage for each alternative.

Table A-10

Planned and existing Roads in the RP Stream Prescription Zone (No Cut)

Alternative 2

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,950	5	0	0
735	0	0	250	1
736	0	0	0	0
737	230	1	340	1
738	2,660	5	0	0
739	3,110	5	0	0
740	0	0	0	0
Total	8,950	15	590	1
Miles	1.7		0.1	

Alternative 3

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,950	5	0	0
735	0	0	250	1
736	0	0	0	0
737	0	0	0	0
738	1,980	3	0	0
739	3,120	5	0	0
740	0	0	0	0
Total	8,050	13	250	1
Miles	1.5		0.1	

Alternative 4

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,900	5	0	0
735	0	0	250	1
736	0	0	0	0
737	230	1	340	1
738	1,980	3	0	0
739	0	0	0	0
740	0	0	0	0
Total	5,110	9	590	1
Miles	1.0		0.1	

Alternative 5

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,950	5	0	0
735	0	0	250	1
736	0	0	0	0
737	230	1	340	1
738	1,980	3	0	0
739	2,880	5	80	1
740	0	0	0	0
Total	8,040	14	670	1
Miles	1.5		0.1	

Alternative 6

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	2,950	5	0	0
735	0	0	250	1
736	0	0	0	0
737	0	0	0	0
738	1,980	3	0	0
739	2,870	5	0	0
740	0	0	0	0
Total	7,800	13	250	1
Miles	1.5		0.1	

Total Rotation (2140)

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	3,180	5	0	0
735	0	0	250	1
736	0	0	0	0
737	230	1	700	1
738	2,910	5	60	1
739	2,980	5	80	1
740	0	0	0	0
Total	9,300	15	1,090	1
Miles	1.8		0.2	

Table A-11 displays the existing and planned roads within the RP Prescription Zone (Partial Cut) by VCU, road segment in miles, and clearing limit acreage for each alternative.

Table A-11
Planned and Existing Roads in the RP Stream Prescription Zone (Partial Cut)

Alternative 2

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	580	1
733	0	0	0	0
735	0	0	0	0
736	0	0	0	0
737	0	0	0	0
738	740	1	210	1
739	1,110	2	0	0
740	0	0	0	0
Total	1,850	3	790	1
Miles	0.4		0.2	

Alternative 3

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	0	0	0	0
735	0	0	0	0
736	0	0	0	0
737	0	0	0	0
738	740	1	210	1
739	1,110	2	0	0
740	0	0	0	0
Total	1,850	3	210	1
Miles	0.4		0.1	

Alternative 4

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	0	0	0	0
735	0	0	0	0
736	0	0	0	0
737	0	0	0	0
738	730	1	0	0
739	0	0	0	0
740	0	0	0	0
Total	730	1	0	0
Miles	0.1		0.0	

Alternative 5

VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	580	1
733	0	0	0	0
735	0	0	0	0
736	0	0	0	0
737	0	0	0	0
738	740	1	190	1
739	950	2	0	0
740	0	0	0	0
Total	1,690	3	770	1
Miles	0.3		0.2	

Alternative 6

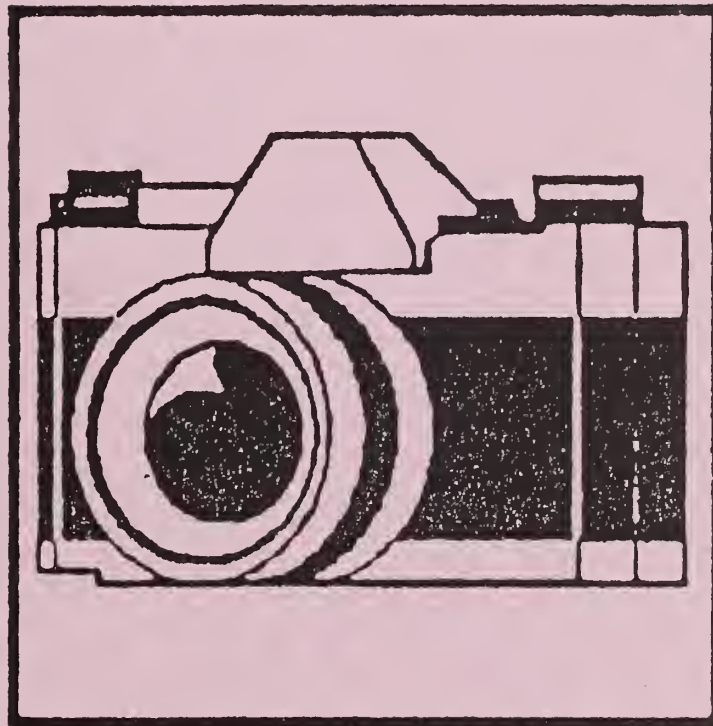
VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	0	0
733	0	0	0	0
735	0	0	0	0
736	0	0	0	0
737	0	0	0	0
738	740	1	0	0
739	1,110	2	0	0
740	0	0	0	0
Total	1,850	3	0	0
Miles	0.4		0.0	

Total Rotation 2140

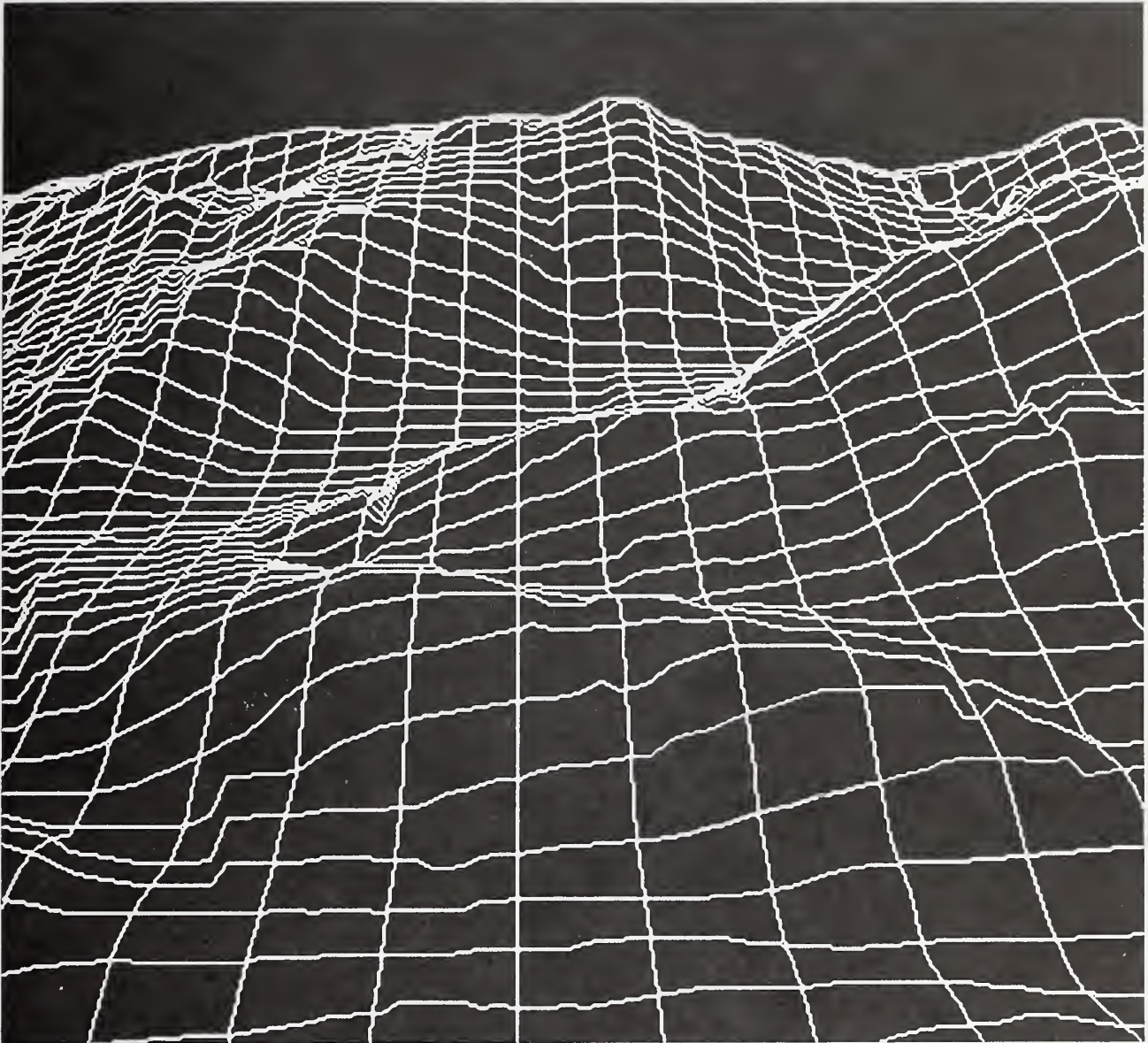
VCU	Existing		Planned	
	Feet	Acres	Feet	Acres
732	0	0	580	1
733	0	0	0	0
735	0	0	0	0
736	510	1	0	0
737	0	0	0	0
738	740	1	210	1
739	1,360	2	0	0
740	260	1	0	0
Total	2,870	4	790	1
Miles	0.5		0.2	

Appendix F

Perspective Plots



PERSPECTIVE PLOTS
Effects of the Alternatives



(Aerial perspective overlooking Francis Cove valley from West Behm Canal)

North Revilla Project Area Sample Viewpoint Locations



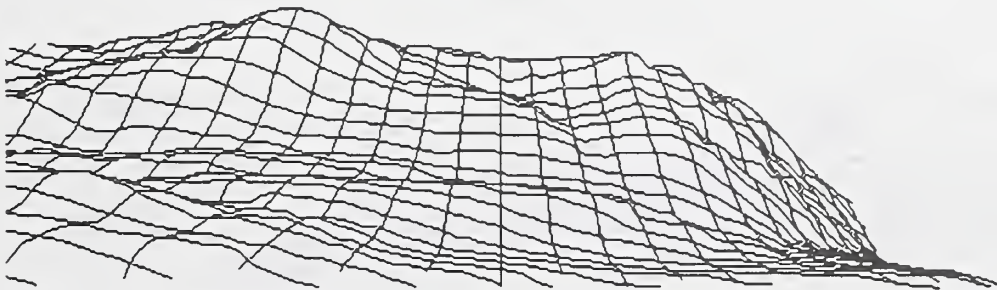
1. Behm Canal at Indian Point - Indian Point to Francis Cove

This 2,036-acre saltwater viewshed is the first in the Project Area encountered while traveling north from the Clover Pass Scenic Area near Ketchikan, and can be seen from the North Point Higgins area. It is adjacent to the Naha Roadless Area. The landscape character consists of an area one-half to one mile in width with less than 25 percent slopes on interspersed hills and knobs. The landform then rises steeply to 2,500-foot ridge tops in the middleground. These slopes face southwest to west towards the Naha and Clover Pass areas and Point Francis on the Cleveland Peninsula across Behm Canal. The visual sensitivity of this viewshed makes it a focal point and a subject for much public concern.

Due to the scope and scale of recent harvest (1990) on these highly visible slopes, this area does not meet the proposed VQO of Modification in the middleground. However, the foreground areas do meet the proposed VQO of Partial Retention.

Alternative 1 - No Action

The Existing Visual Condition (EVC) of this viewshed is heavily altered (V). Of the existing 255 acres of timber harvest, 231 acres (or 11.3 percent of this viewshed) remain visually disturbed. It, however, will meet the VQO sooner if mitigating actions (through rehabilitation) are taken to change the shape of the largest harvest unit (119 acres) from its geometric appearance to one that resembles a natural opening (one that borrows from naturally established forms and lines). Without these changes, the Future Visual Condition (FVC) for this viewshed would remain heavily altered (V) for the next 20--25-years.



2. Behm Canal at Traitors Cove - Francis Cove to Bushy Point

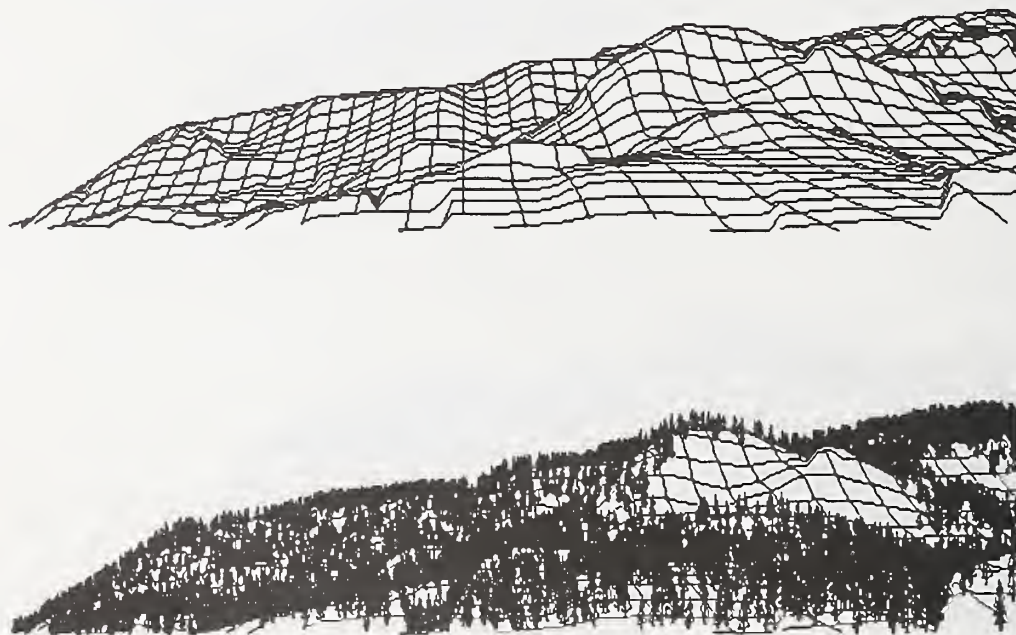
This 4,079-acre saltwater viewshed continues with the mile-wide shelf in the foreground with moderate slopes to under 1,500-foot elevation. The "viewframe" is bisected by the entrance to Traitors Cove with background views of terrain inside the cove. The most recent harvest (1990) is seen on the south-side of the entrance (VCU 740), as shown in the above graphic, and is located on steep sloped knobs facing the viewer. Currently, this area does not meet the proposed VQO of Modification.

The north-side of the cove (VCU 738), due to its flat terrain in the foreground mile-wide shelf, is mostly unseen as well as unaltered (not shown in above graphic). The middleground consists of steep slopes rising to nearly 1,500-foot ridgetop and faces southwest towards the viewer. These slopes were harvested in 1958, have regenerated to approximately 50 to 55 feet high.

Currently, this part of the viewshed meets the proposed VQO's of Partial Retention in the foreground and Modification in the middleground.

Alternative 1 - No Action

The Existing Visual Condition this viewshed ranges from natural condition (I) to slightly altered (III) on the north-side of the Cove entrance to moderately altered (IV) south of the entrance. Although 890 acres have been harvested since the late 1950's, 371 seen acres (or 9.1 percent of this viewshed) remain visually disturbed, mostly on the south-side. The Future Visual Condition (FVC) would remain the same except for continuing change in tree height, color and texture.





Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

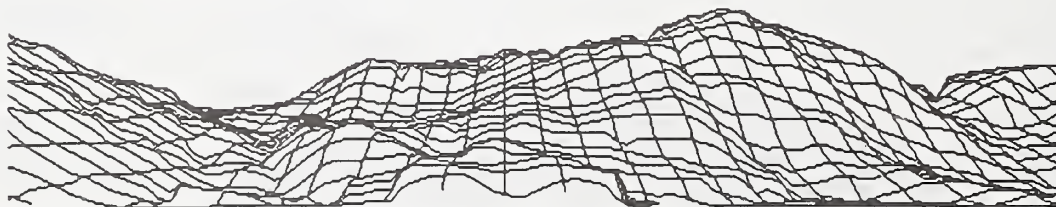
3. Traitors Cove Viewshed - From Virgin Bay to Margaret LTF

This 2,713-acre saltwater viewshed is comprised of a 270 degree "viewframe" from a westerly view of Behm Canal to just north of an existing Log Transfer Facility (LTF) on the eastern shore of the cove. This viewshed consists of moderate to steep slopes angled toward the viewer in a bowl effect. Past harvest has occurred along the west-shore in the late 1950's; on middleground slopes above the north-shore in the mid-1980's; and on the east-shore middleground slopes in the early 1960's.

Currently, this viewshed meets the proposed VQO's of Modification in the foreground and Maximum Modification in the middleground.

Alternative 1 - No Action

The Existing Visual Condition of this viewshed ranges from slightly altered (III) to moderately altered (IV). Of the 725 seen acres harvested since 1958, 126 acres (or 4.6 percent of the viewshed) remain visually disturbed. The FVC would remain the same except for a change in tree height, color and texture.





Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

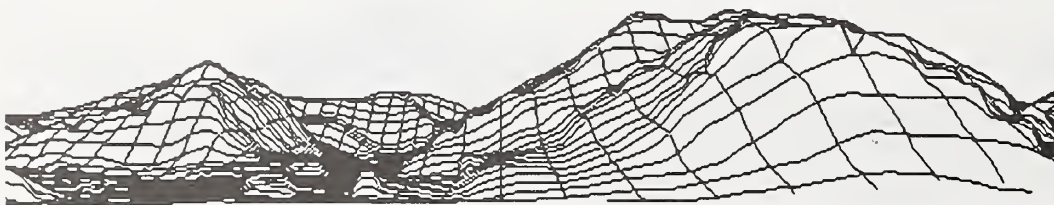
4. Margaret Cove Viewshed

Located southeast of Traitors Cove, this 2,021-acre saltwater viewshed consists of a deeply indented canyon with extensive harvesting in evidence along a wide bottomed valley straddling Margaret Creek and Lake. The view from saltwater is located near the existing LTF on the eastern shore. Due to the wide flat-bottom nature of this viewshed, over 66 percent is unseen. Primarily, the immediate foreground (private land) and the far distant middleground slopes from the 500 to 1,000-foot elevations are the only areas visible.

This viewshed currently meets the proposed VQO's of Modification in the foreground and Maximum Modification in the middleground.

Alternative 1 - No Action

The Existing Visual Condition of this saltwater viewshed is slightly altered (III). Of 509 seen acres harvested since 1957, only 18 acres (or .9 percent of the viewshed) remain visually disturbed. The Future Visual Condition would remain the same, except for changes in tree height, color and texture.





Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

5. Inner Traitors Cove Viewshed - At the head of Traitors Cove

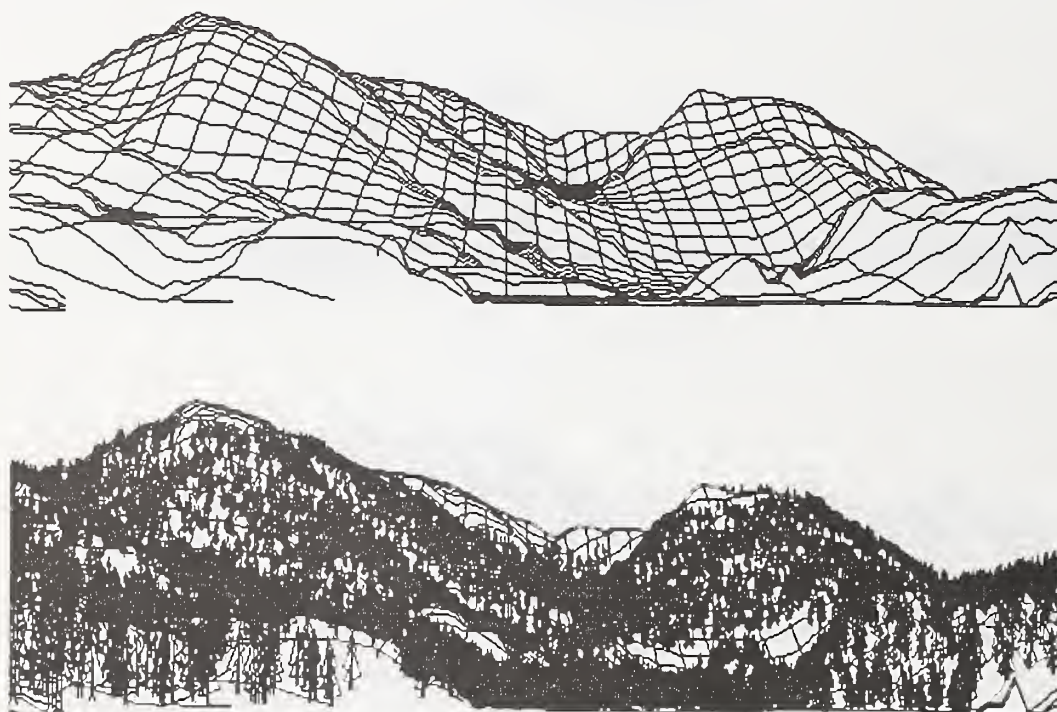
This 8,078-acre saltwater viewshed has some unique features in the context of the Project Area. Public scoping revealed a concern for the scenic quality in this area. It begins at a salt chuck, twists and turns for four miles, averaging one-quarter mile in width, and features the earliest timber harvest entry on the Project Area (1942). The landscape character can best be described as intimate, owing to the vertical nature of the canyon walls, heavy old-growth forest close to the viewer, and the absence of any long views.

This viewshed, the largest in the Project, is primarily located on either side of the cove up to 1,000 to 1,500-foot elevations. Middleground views are found at the head of the cove above Traitors Creek. In addition to the 1942 entry, this viewshed has seen activity in all decades for a total of 1,077 seen acres. Most of the visible harvest occurred along the shorelines.

Currently, this viewshed meets the proposed VQO's of Partial Retention in the foreground and Modification in the middleground.

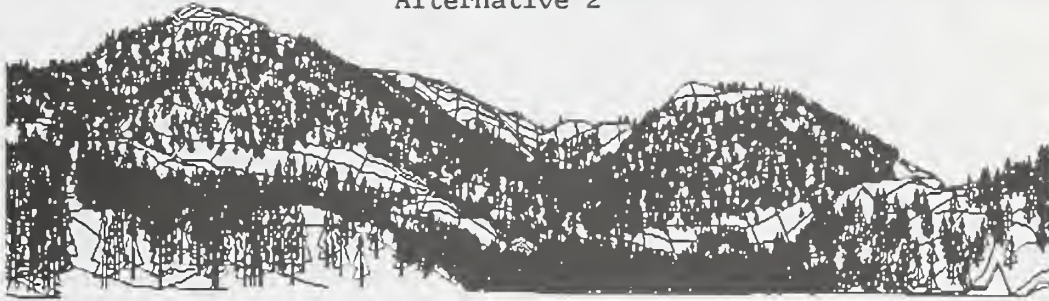
Alternative 1 - No Action

The Existing Visual Condition of this viewshed ranges from slightly altered (III) on the north, northeast, and southwest shore; moderately altered (IV) on the northwest and southeast shore; and natural condition (I) on the upper middleground slopes at the head of the cove. Of the 1,077 seen acres harvested, 788 acres (or 9.8 percent of the viewshed) remain visually disturbed. The FVC would remain the same, except for a change in tree height, color and texture.





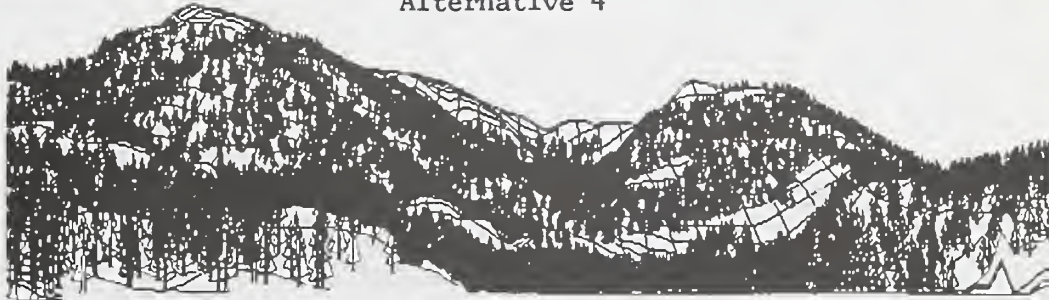
Alternative 2



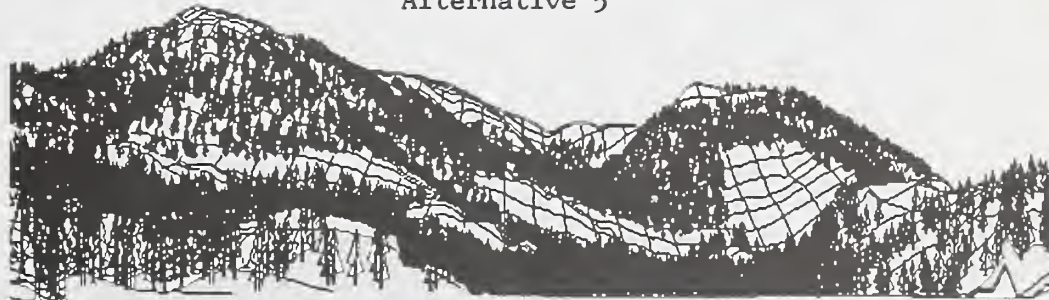
Alternative 3



Alternative 4



Alternative 5



Alternative 6

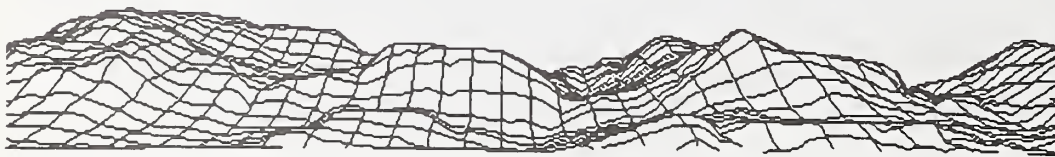
6. Behm Canal at Southwest Neets Bay - Bushy Pt. to Bug Island

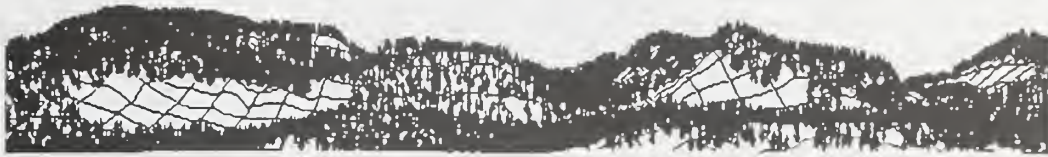
This 2,114-acre saltwater viewshed is located in VCU 736. All harvest in this area has occurred since 1985 on the middleground slopes and draws much attention due to the sharp differences in color, edge and line contrasts, and scale of harvest, resulting in heavily altered visual impacts.

Due to this recent harvest, this area currently does not meet the proposed Modification VQO for middleground views. However, it meets the proposed VQO of Partial Retention for foreground views.

Alternative 1 - No Action

The Existing Visual Condition of this viewshed is heavily altered (V). Of the 476 seen acres harvested since 1960, 412 acres (or 19.5 percent of the viewshed) remain visually disturbed. The Future Visual Condition would remain the same, except for continuing change in tree height, color and texture.





Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

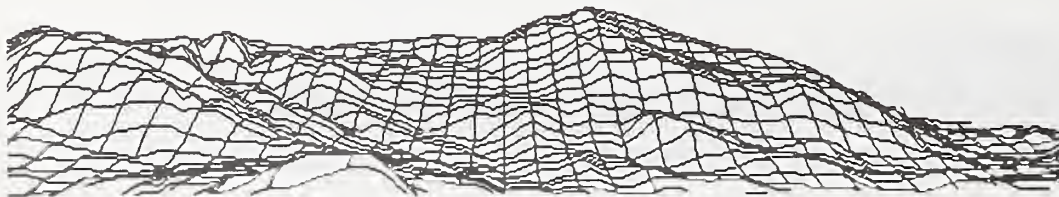
7. Behm Canal at NW Neets Bay - Brow Point to Bug Island

This 5,256-acre saltwater viewshed features the prominent Chin Point, a local landmark. After a boater rounds the headland of SW Neets Bay, the view of Chin Point and the ridge tops at the 2,000- to 2,500-foot elevations, remain in the "viewframe" for an extended time. Harvesting has not occurred in this area since the mid-1970's.

Currently, this viewshed meets the proposed VQO's as noted below. The western-half of this saltwater viewshed is considered more sensitive visually to Behm Canal observers. The proposed VQO's in this area are Partial Retention in the foreground and Modification in the middleground. The eastern half has proposed VQO's of Modification in the foreground, and Maximum Modification in the middleground.

Alternative 1 - No Action

The Existing Visual Condition of this viewshed appears as slightly altered (III) in both foreground and middleground. Of 408 seen acres harvested since 1960, only 113 (or 2.1 percent of the viewshed) remain visually disturbed. Left unchanged, the FCVD would improve to a natural appearing condition (II).





Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

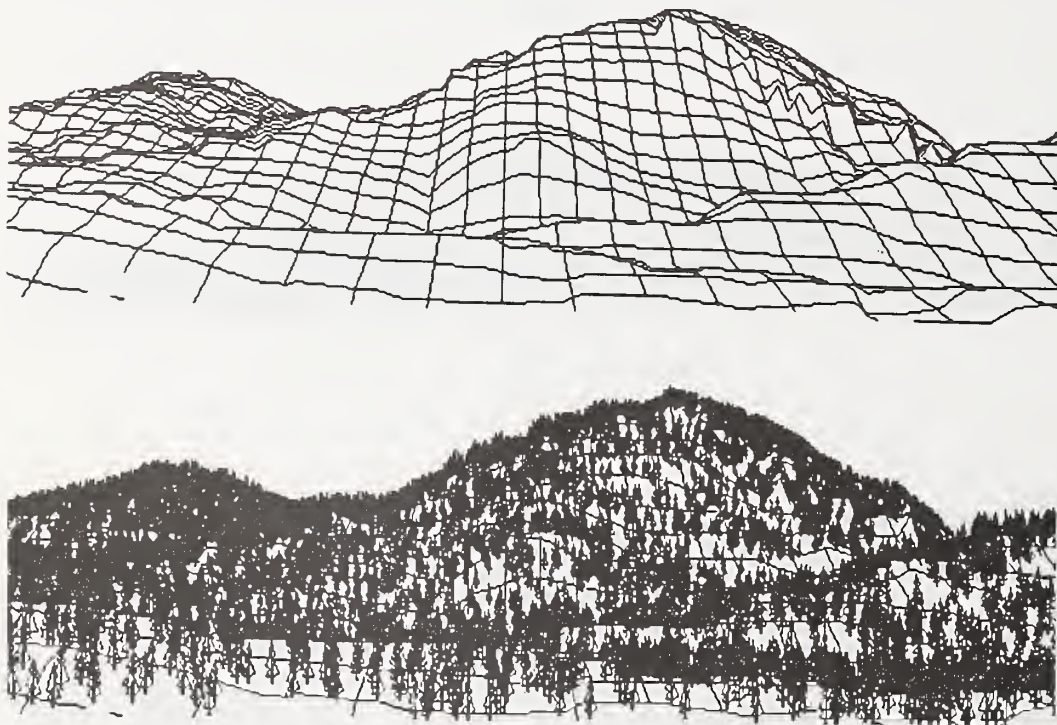
8. Inner Neets Bay - Bug Island to Easy and Vox Points

This 3,834-acre saltwater viewshed is located between Behm Canal and the head of Neets Bay along both north and south shores of Neets Bay. Its terrain features are similiar to both NW and SW Neets Bay viewsheds as discussed above. Although harvest has occurred in this area since 1955, most has regenerated to 48 to 58 feet.

Currently, this viewshed meets the proposed VQO's of Modification in the foreground and Maximum Modification in the middleground.

Alternative 1 - No Action

The Existing Visual Condition of this viewshed ranges from slightly altered (III) on the north side of the bay to moderately altered (IV) on the south side. Of the 1,148 seen acres harvested since 1955, only 142 acres (or 3.7 percent of the viewshed) remains visually disturbed. The Future Visual Condition would remain the same except for the continuing change in tree height, color and texture.





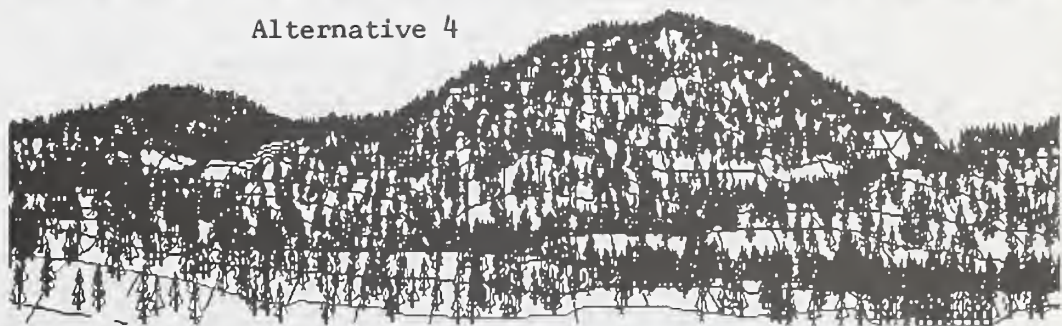
Alternative 2



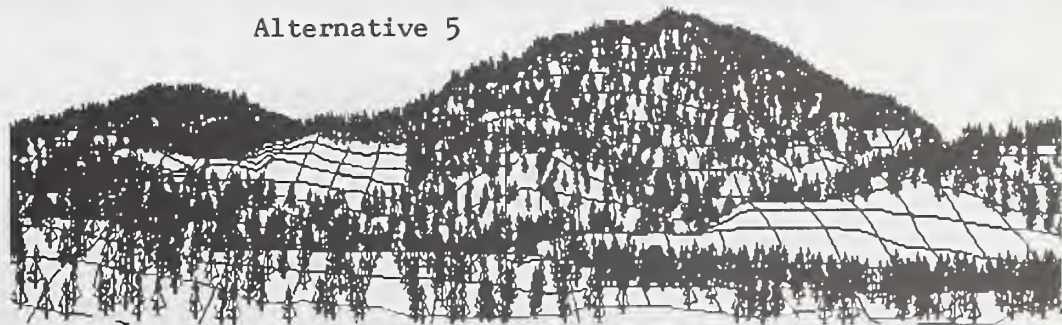
Alternative 3



Alternative 4



Alternative 5



Alternative 6

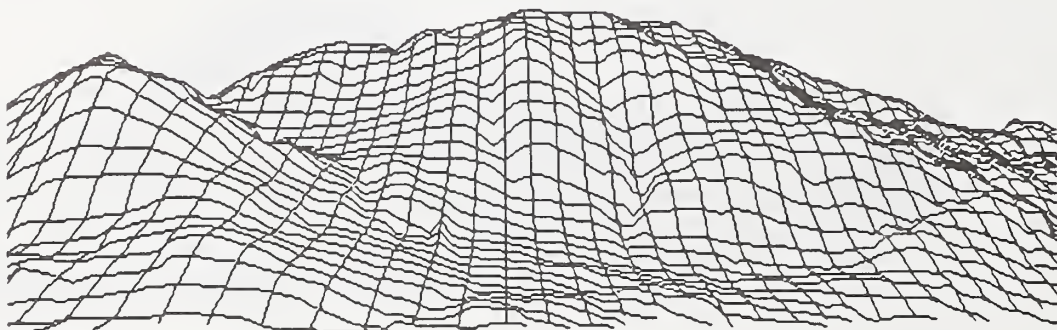
9. Head of Neets Bay - Easy Point to SSRAA Fish Hatchery

This 6,036-acre saltwater viewshed is located within VCU 737. An anchorage and private fish hatchery are located at the head of this bay resulting in moderate boating activity.

Currently, this viewshed meets the proposed VQO's of Partial Retention in the foreground and Modification in the middleground.

Alternative 1 - No Action

The Existing Visual Condition of this viewshed ranges from slightly altered (III) to moderately altered (IV). Of the 1,545 seen acres harvested since 1953, only 85 acres (or 1.4 percent of the viewshed) remain visually disturbed. The Future Visual Condition and landscape mosaic would remain the same except for continuing changes in tree height, color and texture.

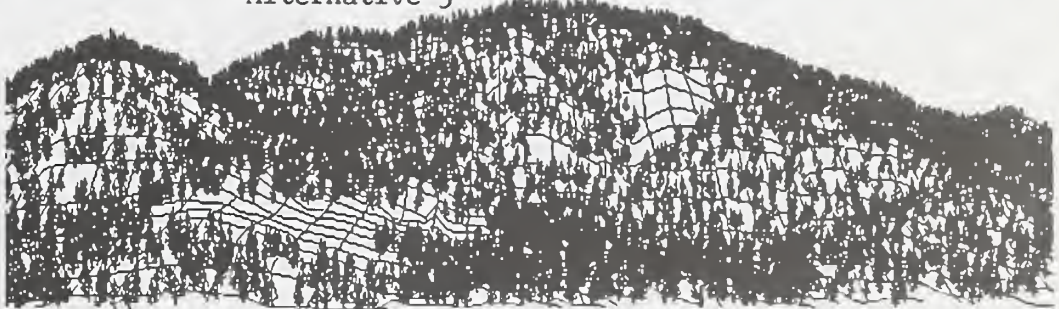




Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

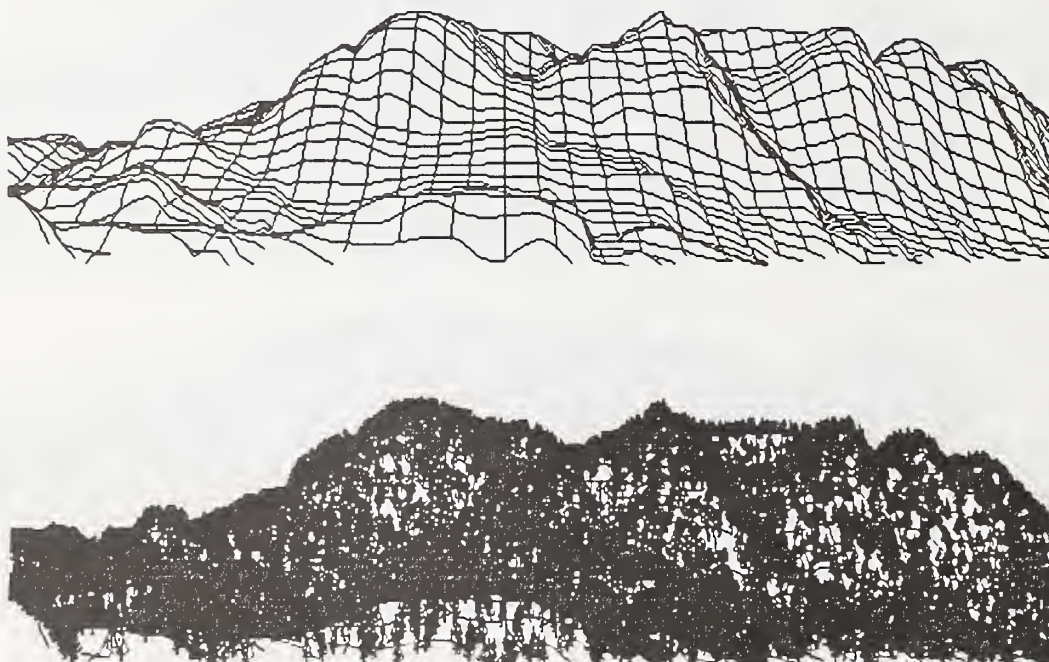
10. Behm Canal at Gedney Pass - Brow Point to Dress Point

This 4,018-acre saltwater viewshed comprises the south shore of Gedney Pass and the south shore of Hassler Island (southern half of VCU 735). Harvest occurred along the shorelines in late 1950's to early 1960's, and is approximately 50 feet in height. The slopes above these harvested areas rise steeply and evenly without much variation, except for rock outcrops, to 2,000 to 2,500-foot ridge tops.

This viewshed currently meets the proposed VQO's of Partial Retention in the foreground and Modification in the middleground.

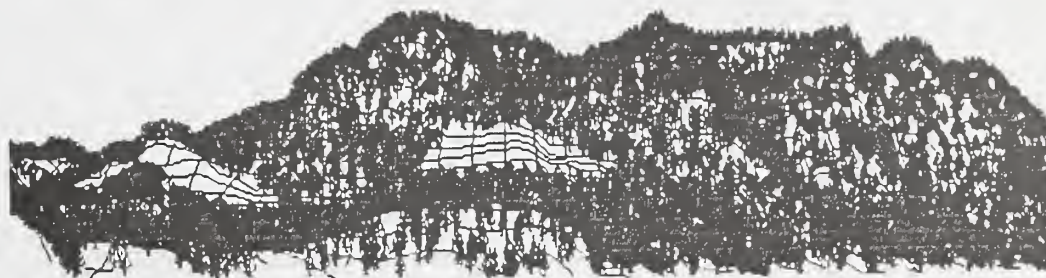
Alternative 1 - No Action

The Existing Visual Condition of Hassler Island appear as moderately altered (IV), and the south shore of Gedney Pass appears as slightly altered (III). Of the 1,035 acres of original harvest, only 224 acres (or 5.6 percent of the viewshed) remain visually disturbed. The Future Visual Condition and landscape mosaic would remain the same except for continuing changes in tree height, color and texture.





Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

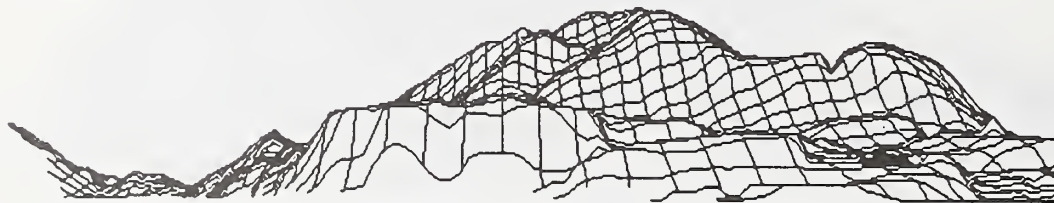
11. Shrimp Bay - Dress Point to Orchard Lake Falls

This 3,812-acre saltwater viewshed comprises the shorelines near Dress Point and the south shores of Shrimp Bay, including a heavily altered peninsula. Harvested in the late 1950's, regeneration has been slowed from the effects of poor soil characteristics and a wildfire. Extremely steep slopes are found north of Shrimp Bay while south to southeast views are of 400 to 600-foot cliffs rising to a flattened shelf, then rising steeply to 2600-foot ridgetops in the middleground.

Currently, this viewshed meets the proposed VQO's of Partial Retention in foreground and Modification in middleground.

Alternative 1 - No Action

The Existing Visual Condition is from natural appearing (II) on the south shore's middleground slopes to moderately altered (IV) along the north shorelines. Of the 868 seen acres harvested, only 182 acres (or 4.8 percent of the viewshed) remain visually disturbed. The Future Visual Condition and landscape mosaic will remain the same except for continuing changes in tree height, color and texture.





Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

12. Klu Bay Viewshed - Off of Shrimp Bay

This 2,473-acre saltwater viewshed is located just north of the Orchard Lake waterfalls at the head of Shrimp Bay. Visually, it is affected by the burned peninsula mentioned above as well as 35-year-old harvest areas in the immediate foreground.

Currently, this viewshed meets the proposed VQO's of Partial Retention in the foreground and Modification in the middleground.

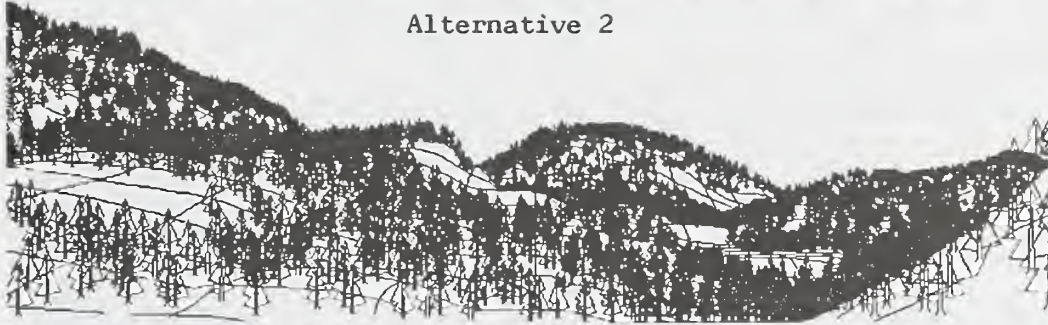
Alternative 1 - No Action

The Existing Visual Condition ranges from natural condition (I) on the northwestern and northern slopes to moderately altered (IV) on the eastern and southeastern slopes. Of the 342 seen acres harvested since 1957, only 88 acres (or 3.6 percent of the viewshed) remain visually disturbed. Left unchanged, the Future Visual Condition and landscape mosaic would remain the same except for continuing change in tree height, color and textures.

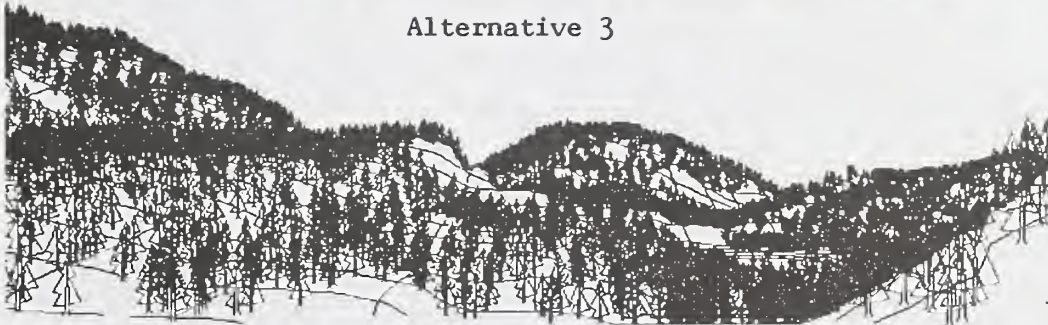




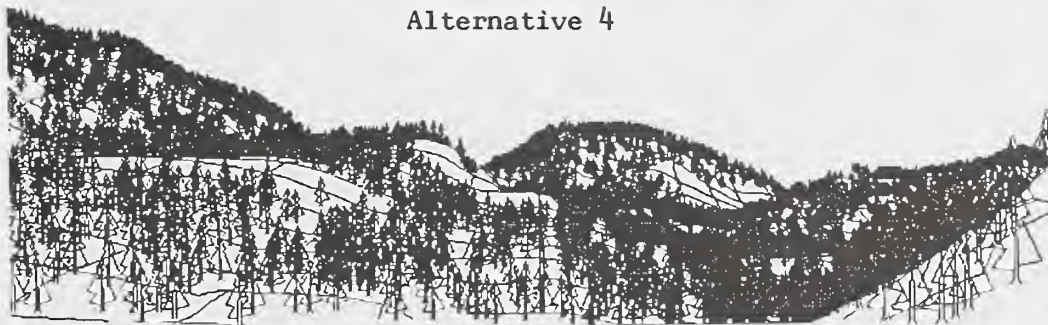
Alternative 2



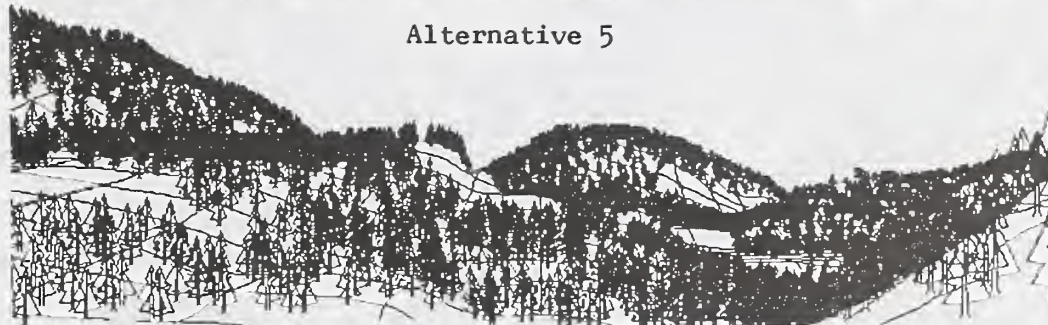
Alternative 3



Alternative 4



Alternative 5

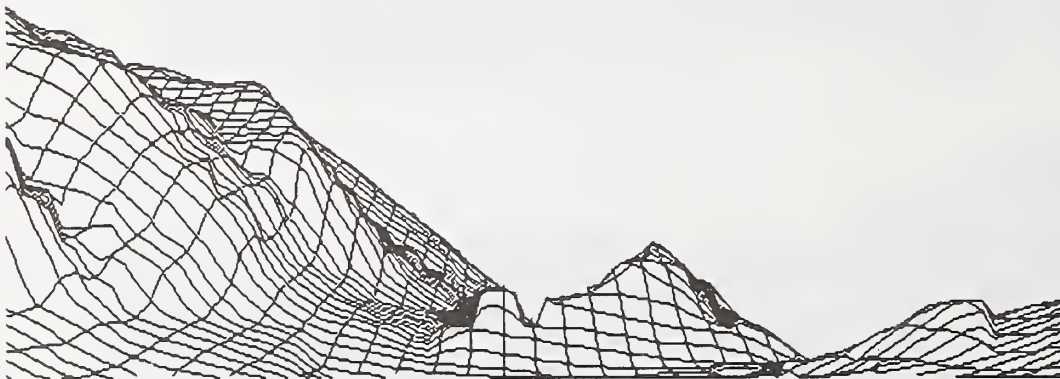


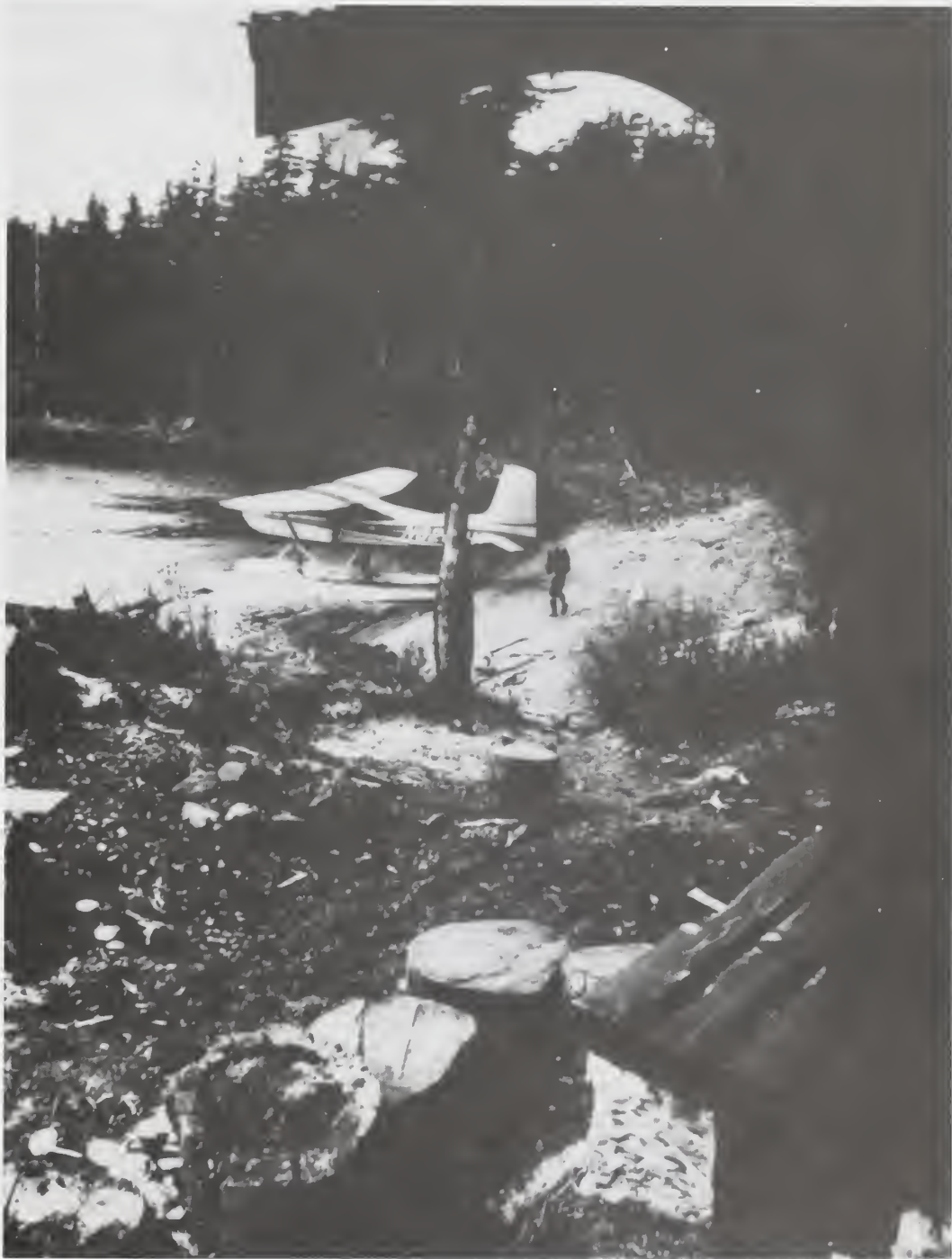
Alternative 6

13. Orchard Lake - Upstream from waterfalls at Shrimp Bay

This 3,464-acre viewshed is the only freshwater viewshed considered. During the public scoping comment period in the fall of 1991, residents and visitors alike commented on its uniqueness. There are two Forest Service cabins on the lake: one near the waterfalls outlet (Plenty Cutthroat) and the other at the head of the lake (Orchard Lake). This latter cabin is outside the Project Area. This viewshed's visual appearance is in a natural condition (Type I) with unaltered far-middleground views of mountaintops of the Shrimp Bay viewshed to the west and Klu Bay viewshed to the north and northeast.

Although timber harvest is precluded in this viewshed, any future recreational facility or management activities are proposed to meet the Partial Retention VQO.





14. Behm Canal at West Hassler - Gedney Island to Black Island

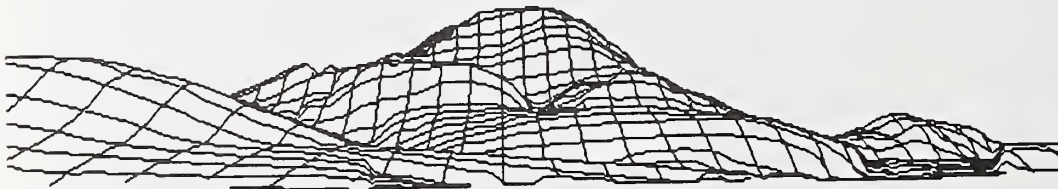
This 1,695-acre saltwater viewshed is viewed from the entrance to Yes Bay across Behm Canal west of Hassler Island. Three islands are in this viewframe: Gedney Island on the right, Hassler Island in the middle, and Black Island on the left. Hassler Island's visually sensitive (low VAC) slopes as seen from this vantage point are primarily those above Blind Pass (between Black and Hassler Islands) and the western face of of the island.

No harvest activities are proposed on either Black or Gedney Islands in this EIS.

Currently, this viewshed meets the proposed VQO's of Retention in the foreground and Partial Retention in the middleground.

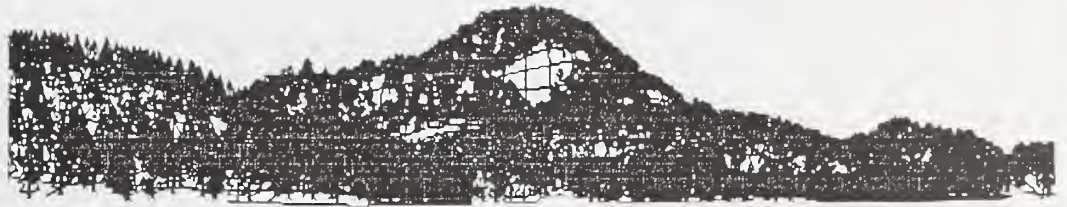
Alternative 1 - No Action

The Existing Visual Condition of this viewshed ranges from natural condition (I) to natural appearing (II). Of the 22 acres harvested in the early 1950's along the shoreline, none remain visually disturbed. Undisturbed, the Future Visual Condition would remain the same except for continuing change in tree height, color, and textures.





Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

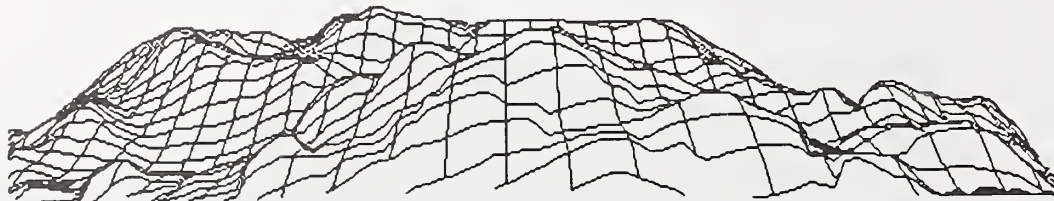
15. Behm Canal at North Hassler - Black Island to Curlew Point

This 1,316-acre saltwater viewshed is viewed from northwest Behm Canal near Snipe Point on Bell Island. From this viewpoint, all of the northern portions of Hassler Island and Black Island can be seen between Hassler Pass and northwest Behm Canal.

Currently, this viewshed meets the proposed VQO's of Retention in the foreground and Partial Retention in the middleground.

Alternative 1 - No Action

The Existing Visual Condition of this viewshed is in a natural condition (I). Left as is, the Future Visual Condition would remain the same except for continuing change in tree height, color, and textures.





Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

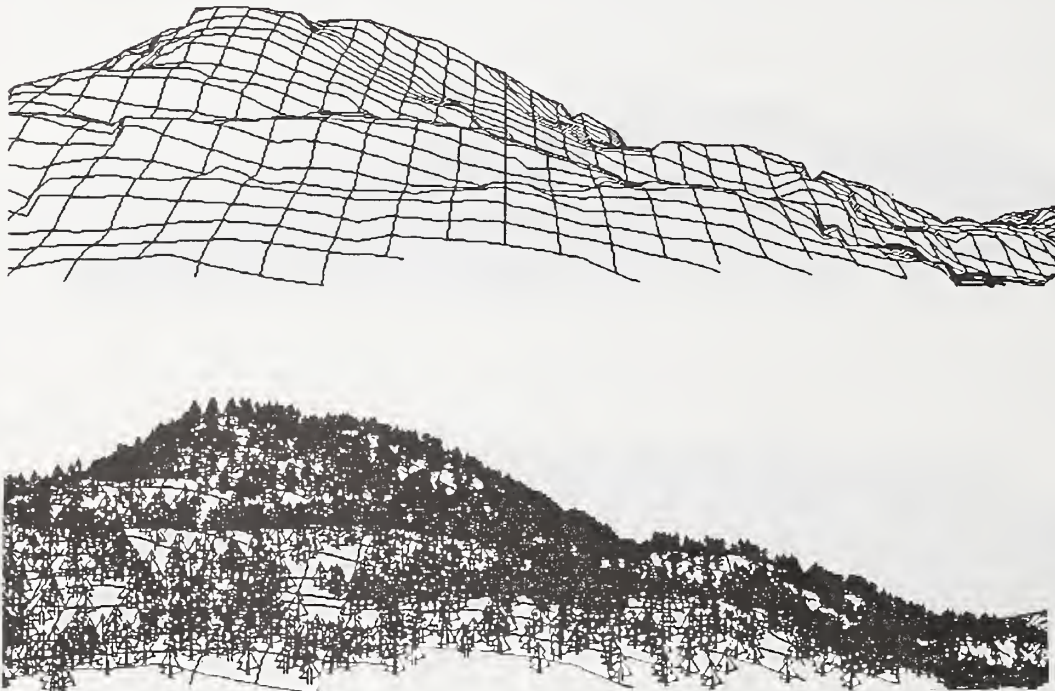
16. South Hassler Pass - Fin Point to the Hassler Island LTF

This 574-acre saltwater viewshed, the smallest in this Project Area, is viewed from the opposite shore of Hassler Pass just north of Gedney Pass near Dress Point. Hassler Pass is very similar in visual character to Inner Traitors Cove viewshed. This is due to its narrow (less than a mile wide) waterway surrounded by very steep slopes rising from water line to nearly 2,000-foot on the west and 3,000-foot on the east. The above graphic depicts a western view of Hassler Island.

Currently, this viewshed meets the proposed VQO's of Partial Retention in the foreground and Modification in the middleground.

Alternative 1 - No Action

The Existing Visual Condition of this viewshed is natural appearing (II). Although 118 acres of timber harvest occurred in 1977, from this vantage point, they are not apparent due to the screening effects of vegetation on the foreground ridge line. The Future Visual Condition (FVC) will remain the same except for continuous change in tree height, color, and texture.





Alternative 2



Alternative 3



Alternative 4



Alternative 5



Alternative 6

Appendix G

**LTF Reconnaissance Report
USDC National Marine Fisheries Service Report
Alaska Timber Task Force Siting Guidelines**

NORTH REVILLAGIGEDO
PROPOSED LOG TRANSFER SITE
Reconnaissance Report

March 23, 1992

Conducted by:	Jim Rhodes	Transportation Planner, SO
	John Weis	Project Engineer, KRD
	Bob Demmert	Transportation Planner, SO

LOG TRANSFER SITES INVESTIGATED

Following are preliminary reconnaissance reports concerning Log Transfer sites investigated in the project area. Sites that were eliminated did not meet numerous siting guidelines. The preferred sites were investigated and are proposed for use in the various alternatives considered in this document.

Relocation of existing sites was generally not considered as the existing sites meet most siting guidelines. Additionally, relocation of the sites would cause impacts in new areas unnecessarily. However, several existing sites considered do not meet numerous current siting guidelines. Where possible, the areas served by such sites were considered for connection by road to an acceptable existing site or to a new site that will meet guidelines.

NORTH REVILLA
LTF RECONNAISSANCE REPORT

March 23, 1992

The general area lies on northwest Revillagigedo Island (see Map 1). The various LTF sites examined are located on Hassler Island in Hassler Pass, Shrimp Bay, Neets Bay, and Traitors Cove.

SUMMARY:

It is recommended that low-angle slide systems be used at North Neets and NW Traitors Cove. All other sites will need to be developed as A-frame systems with guide rails and bulkhead due to the terrain and bathymetry. Following are general discussions concerning the rationale for the above-named recommendations.

Only Shrimp Bay, Fire Cove, and Margaret Bay LTFs serve significant timber volumes which range 25-to-80 MMBF for the currently planned second entry. The third entry will yield less volume than the second.

North Revillagigedo contains very steep mountains and fjords. Because of such steep terrain and bathymetry, very few beach areas are suitable for low-angle slides. Accordingly, many A-frame type LTFs are proposed for very small timber yield areas.

OTHER CRITERIA:

Where possible, existing sites were used rather than new sites to reduce overall effects. In several instances, existing sites did not meet current siting guide lines, nor could they be modified to do so. In such cases, new sites on road connections to other sites, if feasible, are recommended.

Detailed information concerning each site that was investigated is contained in subsequent discussions.

HASSLER ISLAND Site #1

Location: SE 1/4, SW 1/4, Sec. 15, T. 69 S., R.90 E. KTN D-5
55° 52' 57" N, 131° 36' 07" W.

Proposed Volume: 20 MMBF

Facility Type: Proposed low-angle slide.

Upland Area: Ample, moderate ground for developing an operations area.

Rafting Area: Ample deep water rafting area. Water depth area is relatively protected from extreme marine and weather actions.

Barge Off-Loading: Initial landings will need to be made near a rock source for construction. A temporary skid trail from beach to the rock source will be needed until a road linking the LTF and rock source is built. A brow log with a small embankment will be needed at both the temporary and final barge landings. The temporary barge landing will be located when a suitable rock source is found.

Camp Facilities: It is expected that Hassler Island will be served by use of a floating camp. Numerous protected float camp sites are available within boating distance from the LTF. Such areas are Shrimp Bay, Klu Bay, Dress Point, and areas adjacent to the LTF.

Access: Uplands are moderate and will accommodate moderate grades in and out of the LTF area.

Marine Conditions: The beach is rocky and drops quickly, then flattens out for 200 ft, and then drops to extreme depths. This site is ideal for a 10 percent slide system. The lower end of the slide would be at the point where the terrain breaks to extreme depths.

Fisheries: Nearest cataloged fish stream is 3/4 mile southeast of the site. Another stream lies 3/8 mile northwest of the site. This stream is not a cataloged fish stream.

Other

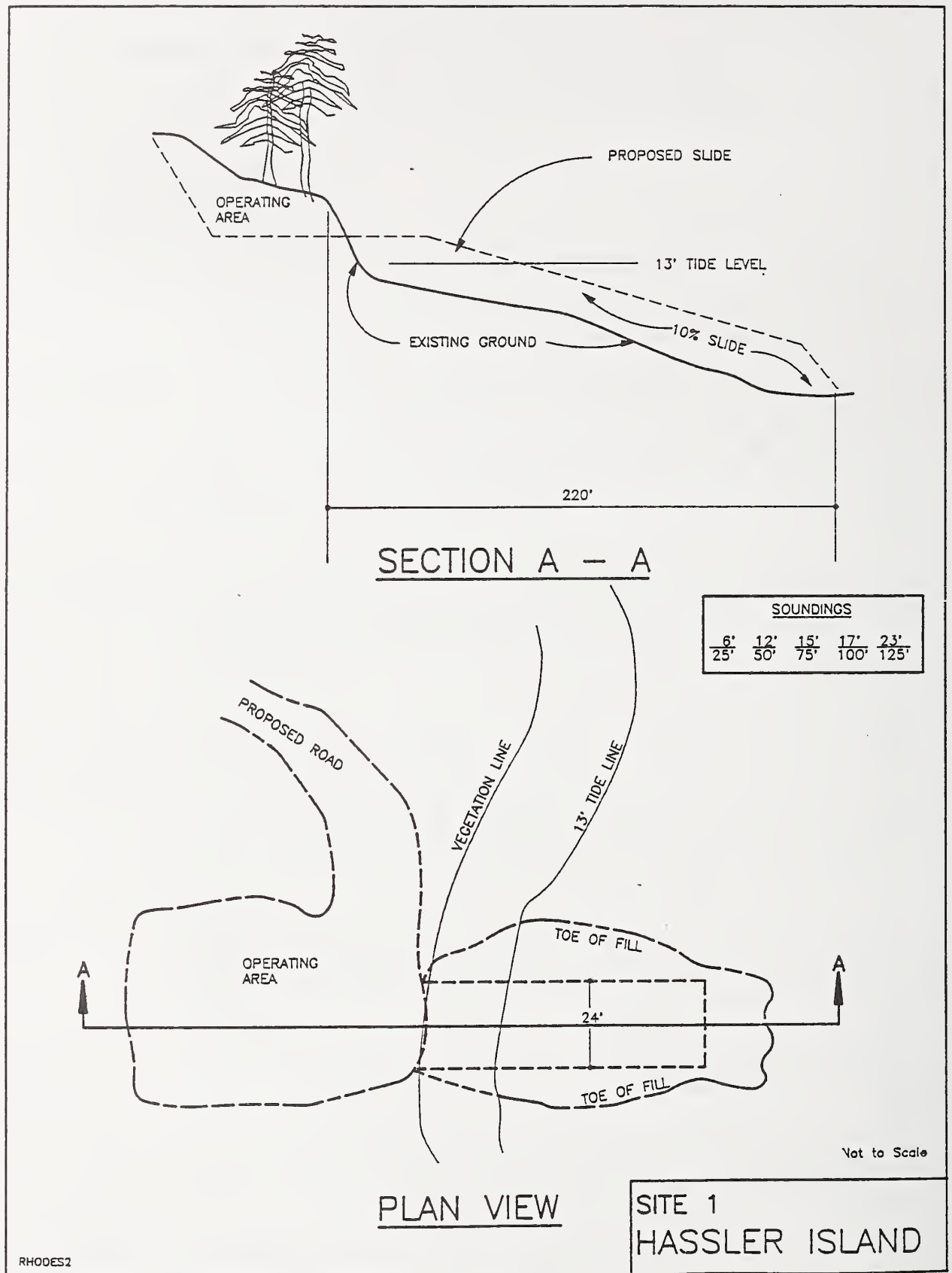
Environmental: Site is relatively well-protected from heavy wind and wave action. Hassler Pass is 500 to 600 feet deep.

The site is visual from about 1/2 of Hassler Pass. The LTF is not visual from Behm Canal. However, rafting and float camp facilities would be visible from Behm Canal and Gedney Pass. The LTF is not visual from Gedney Pass.

Tideland Plane: There are no current tideland plans for this area.

Recommendations: Conduct a marine investigation.

Develop Site #1 as a low-angle slide to accommodate very small infrequent harvest operations.



HASSLER ISLAND Site #2

Location: NE 1/4, SE 1/4, Sec. 22, T. 69 S., R. 90 E. KTN D-5.
55° 52' 17" N, 131° 35' 21" W.

Proposed Volume: 20 MMBF

Facility Type: Existing steep slide, last used in 1977. Requires conversion to an A-frame and bulkhead with guide rails. This site will not accommodate a low-angle slide system.

Upland Area: Ample moderately sloped ground for operating area. Existing site will require major excavation to accommodate an A-frame system with bulkhead.

Rafting Area: Ample area for rafting. Hassler Pass is very deep and well-protected from heavy seas and wind actions.

Barge Off-Load: Existing site is adequate for barge landings.

Camp Facilities: It is expected that Hassler Island operations will be served by use of a floating camp. Numerous float camp sites are available within boating distance from the LTF. Such areas as Shrimp Bay, Dress Point, and adjacent to the LTF.

Access: The existing road will need to be relocated to accommodate an A-frame with bulkhead. The existing road is 15 to 18 percent favorable. The existing road would need to be undercut to accommodate an A-frame system, thus the road will need to be relocated for about 500 feet. Grades will be between 15 and 18 percent favorable.

Marine Conditions: The site has a very steep, rocky beach suitable for development of an A-frame system. The bathymetry is steep allowing bark deposit to move to extreme depths.

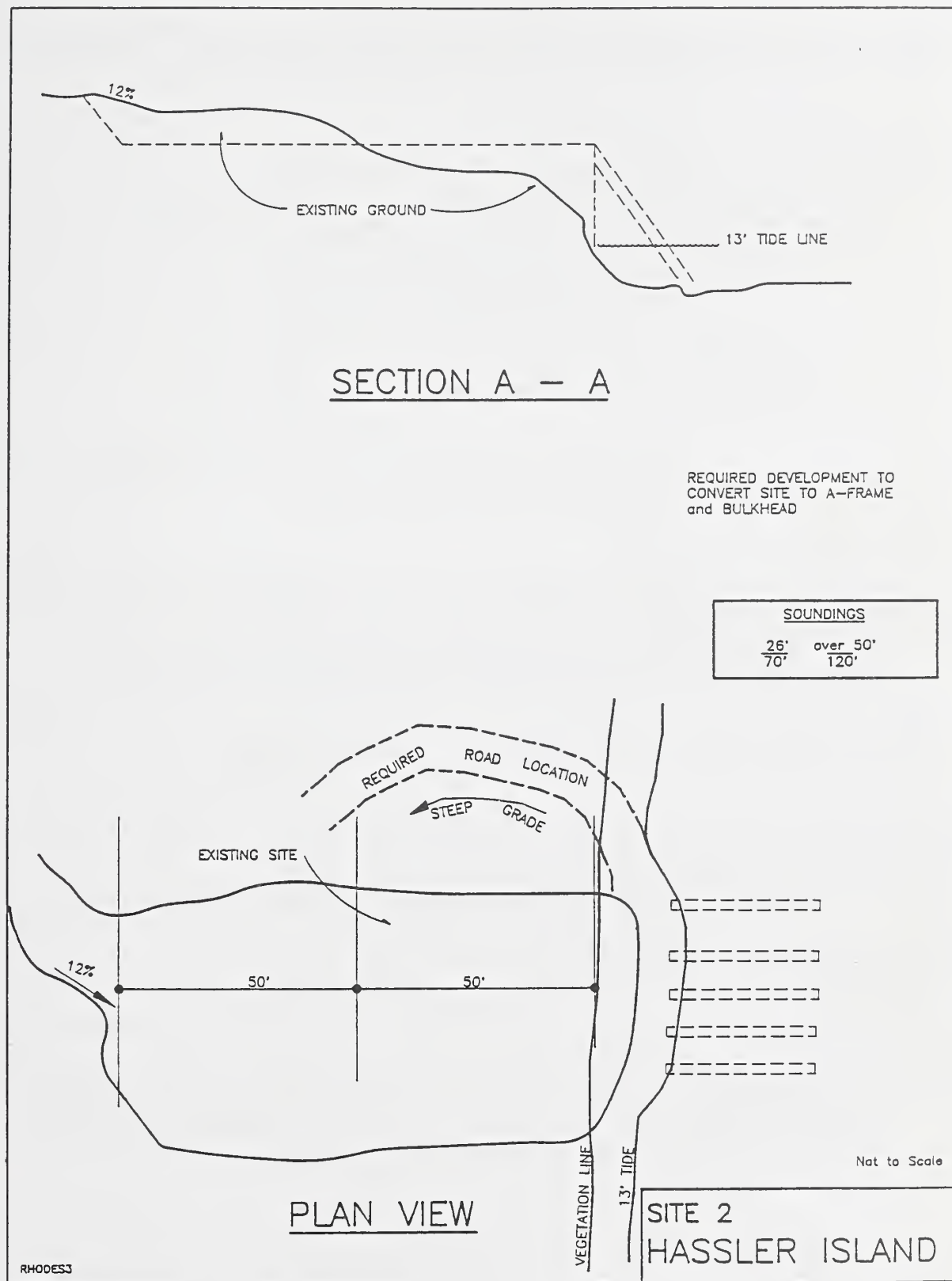
Fisheries: The nearest cataloged fish stream is #101-80-13. This stream is 1/4 mile NE of the site.

Other
Environmental: This site is protected from adverse marine and weather action. The LTF is highly visible from a small portion of Hassler Pass. An eagle tree is immediately south of the existing LTF site. Reconstruction will require reconnaissance activities to determine the proximity of the eagle tree.

Tideland Plans: This area is not covered in a detailed state tideland plan.

Recommendations: Conduct marine investigation to determine if site has fully recovered or highly impacted.

This existing site is not recommended as it cannot be converted to a low-angle slide. This island will require small operations to clean-up and maintain the Forest. Hassler Island is small (7 or 8 square miles, thus, not supporting a large operation. Re-entries will be infrequent; small equipment and small operations will be used to harvest the area.



DRESS POINT Site #3

Location: SW 1/4 NW 1/4 Sec. 25, T. 69 S., R. 90 E. KTN D-5
55° 51' 26" N. 131° 33' 21" W.

Proposed Volume: Not being used.

Facility Type: Existing steep slide. Used in 1976.

This facility is not being considered for reuse in this plan: No timber volume tributary to this site is being scheduled.

* * * * *

KLU BAY Site #4

Location: N 1/2 SW 1/4 Sec. 34, T. 69 S., R. 91 E. KTN D-5
55° 50' 30" N. 131° 27' 11" W.

Proposed Volume: 16 MMBF

Facility Type: Existing A-frame lift off with bulkhead and guide rails.

This facility may require minor reconstruction including bulkhead reconstruction and installation of an A-frame lift-off machine.

* * * * *

Shrimp Bay Site #5

Location: SE 1/4 NW 1/4 Sec. 5, T. 70 S., R. 91 E. KTN D-5
55° 49' 57" N. 131° 29' 57" W.

Proposed Volume: 14-33 MMBF

Facility Type: Existing A-frame lift-off system with bulkhead and guide rails.

This facility may require minor reconstruction including bulkhead and guide rail replacement and installation of an A-frame lift-off machine.

CHIN POINT Site #6

Location: SE 1/4 NW 1/4 Sec. 18, T. 70 S., R. 90 E. KTN D-6
 55° 47' 59" N. 131° 40' 53 ".

Proposed Volume: 18 MMBF

Facility Type: Existing float-off system. Logs are dragged onto the beach and floated off. A ramp will need to be developed.

Upland Area: The uplands are moderately sloped allowing for developable upland operating area.

Rafting Area: Ample water depth for rafting. This area is highly exposed to wind and wave action. Log boom may need to be built in such a way to make it serve as a floating breakwater.

Barge Off-Load: Initial landings will need to be made at high tide on the existing road. Subsequent landings can be made at the LTF site.

Camp Facilities: This area can be served by both upland or floating camps. It is expected that this area will be served by float camps located in more protected areas such as Fire Cove, Southwest Neets Bay, or an area 2 to 3 miles east of NW Neets site Site #6.

Access: An abandoned existing road accesses this site. Grades are moderate. The existing road will require major reconstruction.

Marine Conditions: The beach slopes at 10 percent. The LTF structure would lie on the edge of the gentle sloping gravel segment of the beach. The end of the LTF ramp would be at the break in slope of the beach.

Fisheries: A cataloged fish stream #101-90-02 is close to the LTF site. Another cataloged fish stream #101-90-03 lies 1/4 mile east of the site.

Other

Environmental: Eagle trees lie about 1/8 mile west and 1/2 mile east of the site.

This site is highly exposed to prevailing storms and wave action.

Visually, this site can be seen from most of Neets Bay and from Behm Canal. This site is low in profile, including the uplands, thus, minimizing visual impacts.

Tideland Plans: There are no current tideland plans for this area.

Recommendations: Conduct a marine investigation to determine suitability for this facility.

Determine proximity of fish stream in accordance with siting guidelines.

Determine proximity of eagle trees.

Develop this site as a low-angle slide to accommodate small operations.

Investigate possibility of using LTF sites #7, #8, or #9 in place of this site as only one LTF is needed.

CHIN POINT Site #7

Location: NW 1/4 SE 1/4 Sec 18 T.70 S. R.90 E KTN D-6
55° 48' 0" N. 131° 40' 19" W.

Proposed Volume: 18 MMBF

Facility Type: Low-angle Slide

Upland Area: Uplands are moderately sloped allowing for developable upland area.

Rafting Area: Ample water depth for rafting. This area is highly exposed to wind and wave action. Log boom may need to be build in such a way to make it serve as a floating breakwater.

Barge Off-Load: Initial landings can be made at existing Site #8. Subsequent landings can be made at Site #7.

Camp Facilities: This area can be served by both upland or floating camps. It is served by float camps located in more protected areas such as Fire Cove, Southwest Neets bay, or an area two-to-three miles east of NW Neets, Site #6.

Access: Uplands are moderated allowing for easily developed access.

Marine Conditions: The beach slopes at 10-to-12 percent. The LTF structure would be close to the point where the bottom becomes steep.

Fisheries: Cataloged fish stream # 101-90-03 lies approximately 550 west of the site.

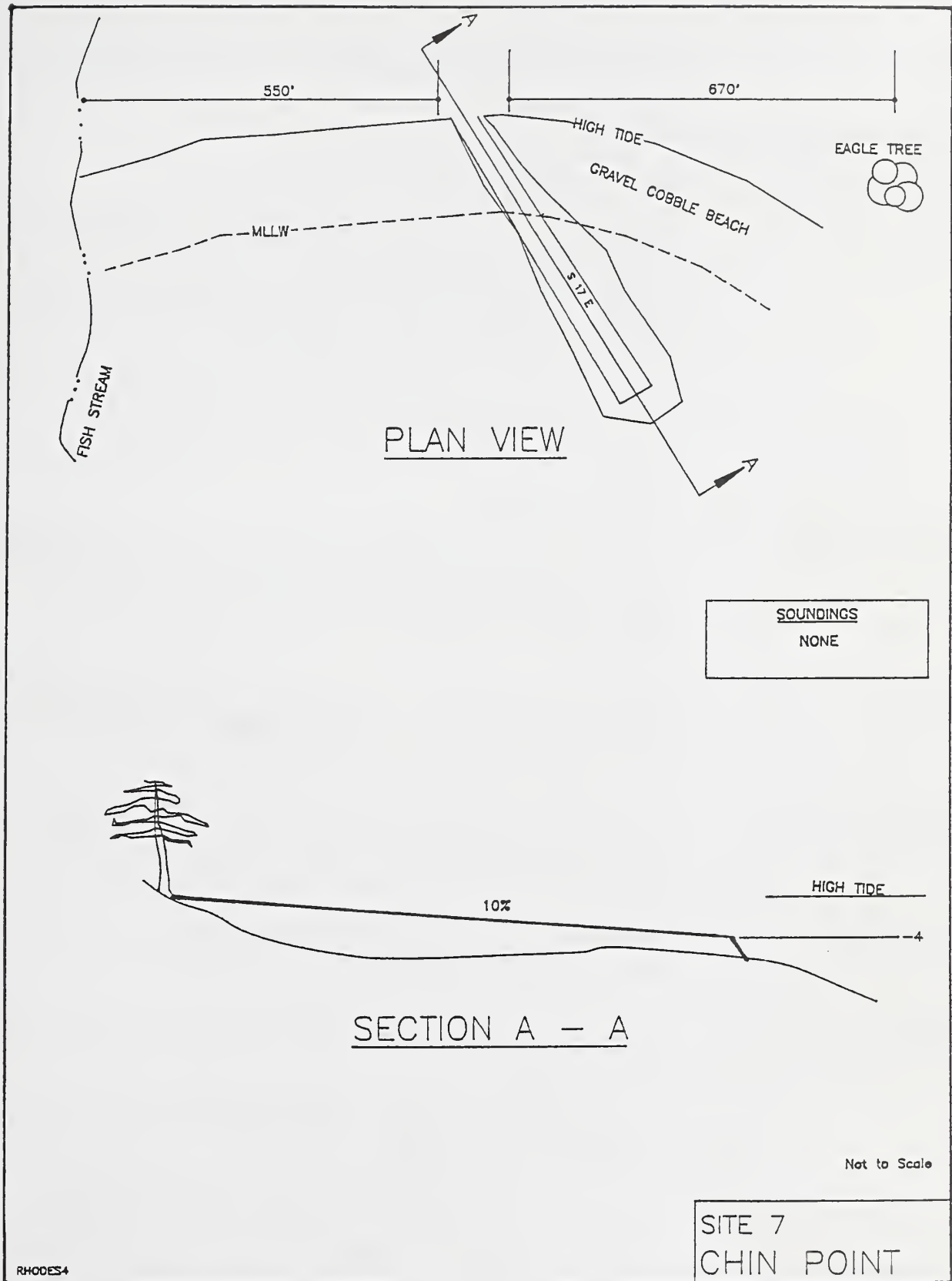
Other

Environmental: An eagle tree is located 570' east of the site. Visual, the site will have a very low profile as the beach will require a minimal structure and the uplands are relatively flat. The site operating area is within an existing clear cut.

Tideland Plans: There are no current tideland plans for this area.

Recommendations: Conduct a marine investigation to determine site suitability. Develop this site as a low-angle slide to accommodate small operations.

Locate the structure alignment as close to S. 17° E as possible to situate the lower end of the structure further away from the fish stream as possible. This will also place the lower end of the structure closer to the point where the bathymetry changes to steep slopes.



NORTH NEETS Site #8

Location: NW 1/4 NE 1/4 Sec. 20, T. 70 S., R. 90 E. KTN D-5
55° 47' 32" N. 131° 38' 48" W.

Proposed Volume: 18 MMBF

Facility Type: Existing Steep Slide.

Upland Area: The upland area is a small level area approximately 50' X 70', backed by a large rock cut. This site cannot be converted to a low-angle slide. Conversion to an A-frame system would require a very large fill to reach appropriate water depths. Otherwise, the site could only be used during high tide levels.

Rafting Area: Ample rafting area and water depth. This area is relatively exposed to high winds and water action.

Barge Off-Load: Initial Landing can be made during high tide levels at the existing LTF.

Camp Facilities: It is expected that Hassler Island will be served by use of a floating camp. Numerous protected float camp areas are available within boating distance from the LTF. Such areas are Shrimp Bay, Klu Bay, Dress Point, and others.

Access: This site contains an existing road that will require major reconstruction. If possible, this road system will be connected to NW Neets Bay site #6, thus, eliminating the need for this site.

Marine Conditions: The beach is rocky and steep; then it flattens out for 125 feet, after which it drops to extreme depths. This site will require a very large fill, bulkhead, and footprint to reach adequate water depths.

Fisheries: Cataloged fish streams #101-90-04 and #101-90-05 lie west and east from the LTF respectively.

Other
Environmental: The nearest eagle tree is approximately 1/4 mile west of the LTF site.

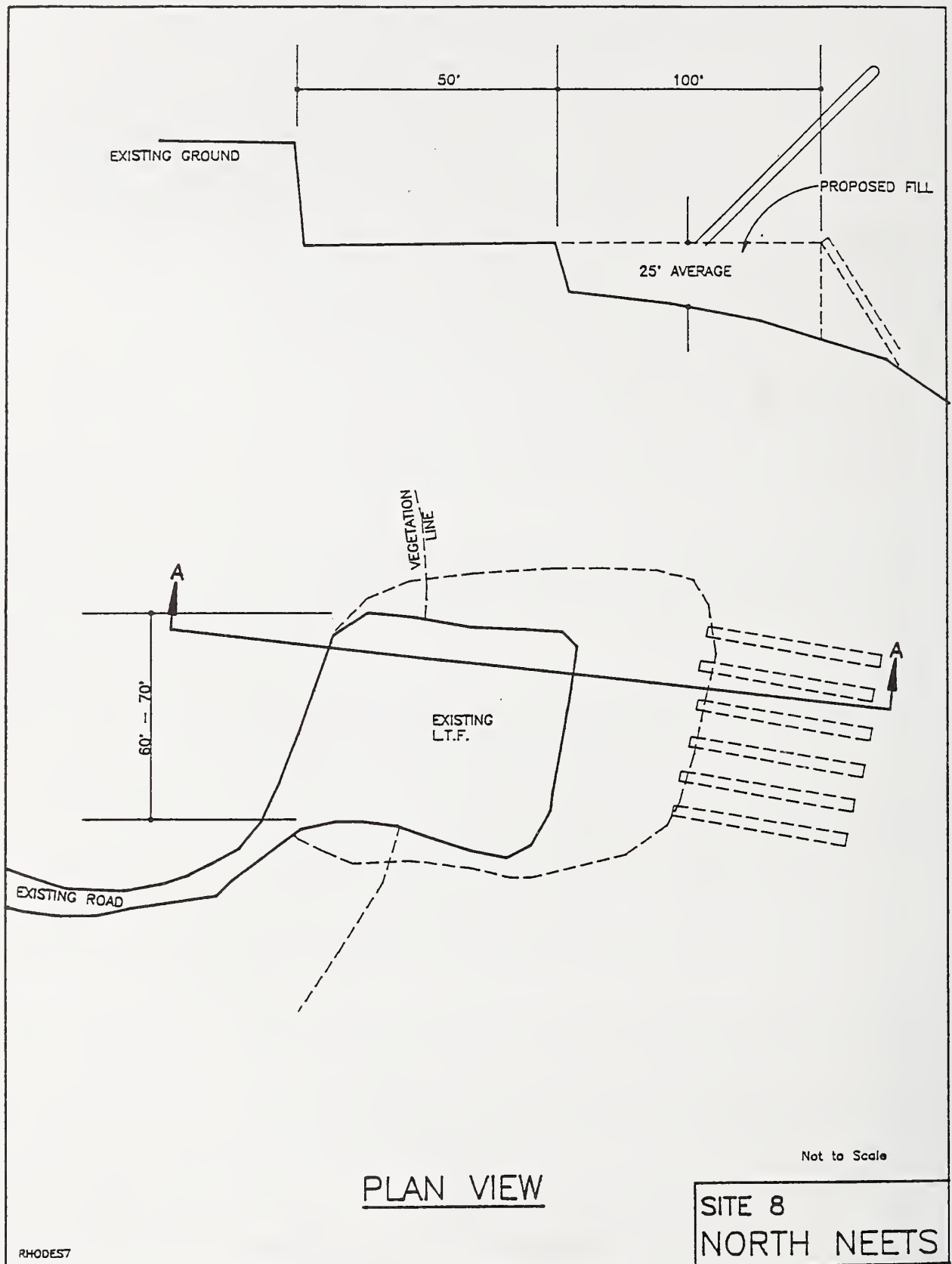
Site #8 would be visible from the western 1/4 of Neets Bay and from Behm Canal. This site is invisible to the remainder of Neets Bay.

Tideland Plans: There are no current tideland plans for this area.

Recommendations: Conduct a marine investigation.

Develop a site as an A-frame lift-off system with bulkhead and guide rails. This site will not accommodate a slide-type system due to the terrain.

Investigate possibility of using sites #6, #7, or #9 as only one of these sites is needed to serve the tributary timber. It would be preferable to use site #6 as this tributary area is small. The slide system at site #6 would accommodate small operations and equipment.



NORTH NEETS Site #9

Location: NW 1/4 NE 1/4 Sec. 20, T. 70. S., R. 90 E. KTN D-5
53° 47' 29" N. 131° 38' 36" W.

Proposed Volume: 18 MMBF

Facility Type: A-frame with bulkhead.

Upland Area: The uplands are steep for 30 to 60 feet, then level off into rolling terrain. A large excavation will be necessary.

Rafting Area: Ample rafting area and water depth. This area is relatively exposed to high winds and wave action.

Barge Off-Load: Initial landings can be made at Site #8. Then a barge landing can be developed at the Site #9 site.

Camp Facilities: Same as Site #8: It is expected that Hassler Island will be served by use of a floating camp. Numerous protected float camp areas are available within boating distance from the LTF. Such areas are Shrimp Bay, Klu Bay, Dress Point, and others.

Access: About 500 feet of road will need to be built from Site #8 to Site #9.

Marine Conditions: Same as Site #8: The beach is rocky and steep; then it flattens out for 125 feet, after which it drops to extreme depths. This site will require a very large fill, bulkhead, and footprint to reach adequate water depths. However, the footprint in the tidal area would be slightly smaller.

Fisheries: Cataloged fish stream #101-90-05 lies 1/2 mile east of Site #9 and #101-90-04 lies 3/4 mile west.

Other
Environmental: The nearest eagle tree is about 3/8 mile west of Site #9.

Site #9 is exposed to heavy wind and wave action.

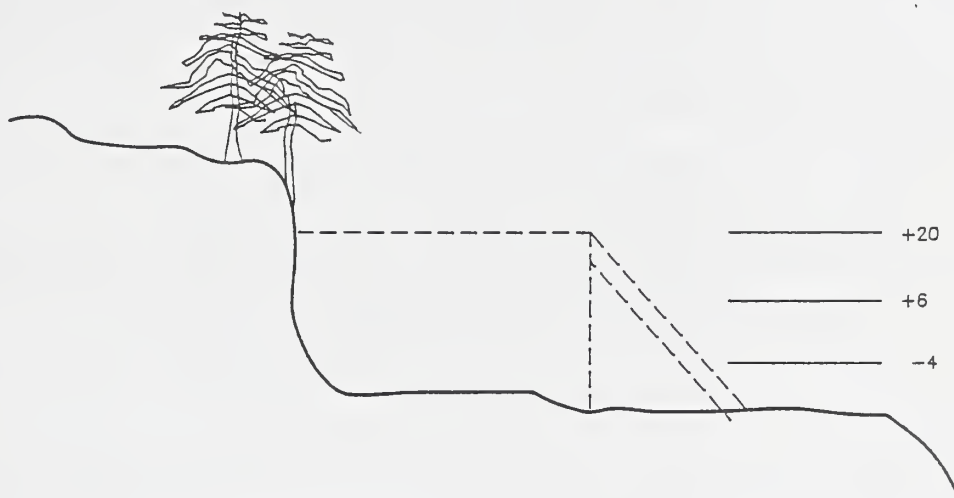
Visually, this site is visible from the western 1/4 of Neets Bay and from Behm Canal.

Tideland Plans: There are no current tideland plans for this area.

Recommendations: Conduct a marine investigation.

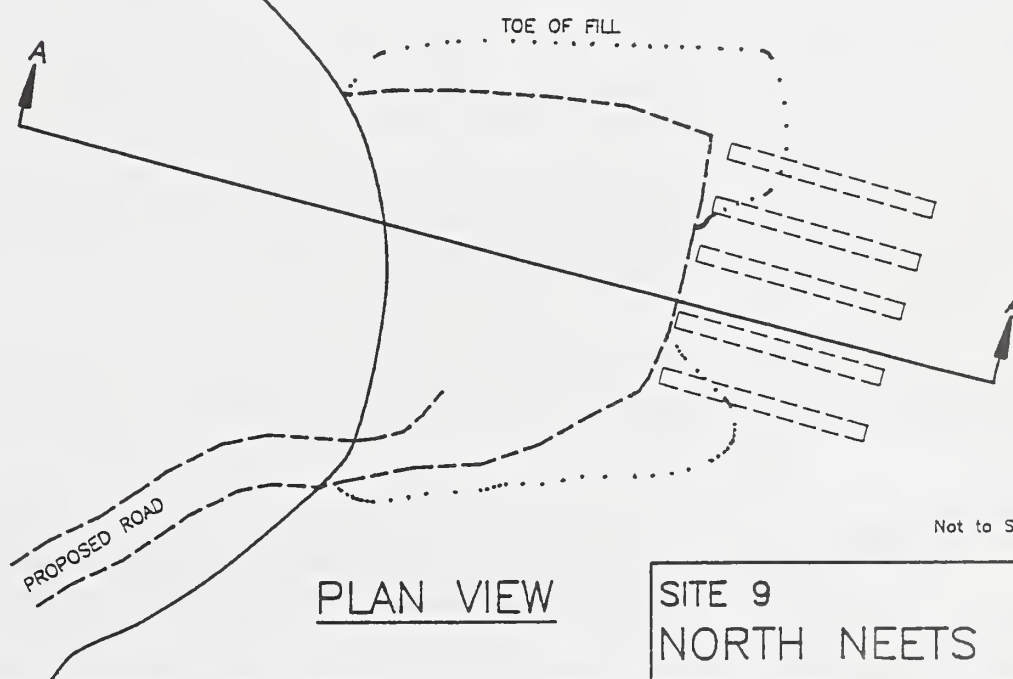
Develop a site as an A-frame lift-off system with bulkhead and guide rails. This site will not accommodate a slide type system due to terrain.

Investigate possibility of using Sites #6, #7, or #8 as only one of these sites is needed to serve the tributary timber. It would be preferable to use Site #6 as the tributary area is small. The slide system at Site #6 would accommodate small operations and equipment.



SECTION A - A

SOUNDINGS			
$\frac{10'}{50'}$	$\frac{11'}{70'}$	$\frac{27'}{150'}$	$\frac{50'}{200'}$
● +6 TIDE			



Not to Scale

PLAN VIEW

SITE 9
NORTH NEETS

RHODESS

CLAM ISLAND Site #10

Location: SE 1/4 NE 1/4 Sec. 21, T. 70 S., R. 90 E. KTN D-5
55° 47' 07" N. 131° 36' 55" W.

Proposed Volume: 7 MMBF

Facility Type: Existing steep slide. Can be converted to a low-angle slide.

Upland Area: Area is confined in a narrow draw. Considerable excavation will be required to expand the operating area for truck off-loading.

Rafting Area: Ample rafting area with deep water. Area is somewhat exposed to wind and wave action.

Barge Off-Load: Barge off-loading can be developed adjacent to the LTF. A small brow log and embankment will be needed for the barge landing.

Camp Facilities: Same as for Sites #6, #7, #8., and #9.

No upland area is available for a land camp. Additionally, there are no adequate water sources near this site.

Access: The existing road enters the site at an 18 percent grade. The access way is a narrow draw with a natural grade of 18 percent. This route will require major reconstruction.

Marine Conditions: The beach is gentle sloping with large rock out-crops. Approximately 200 feet seaward the bottom drops to depths greater than 50 feet.

Modification of the steep slide will expand the current footprint to approximately twice its current size. The current fill will be incorporated into the new slide and barge off-load ramp.

Site #10 is relatively protected at the LTF site.

Fisheries: Nearest cataloged fish stream is 1/2 mile west of the site.

Other
Environmental: An eagle tree lies 1/4 mile east of Site #10. The site will not be of use at +2 ft. and lower tide levels because the beach is too steep to build on.

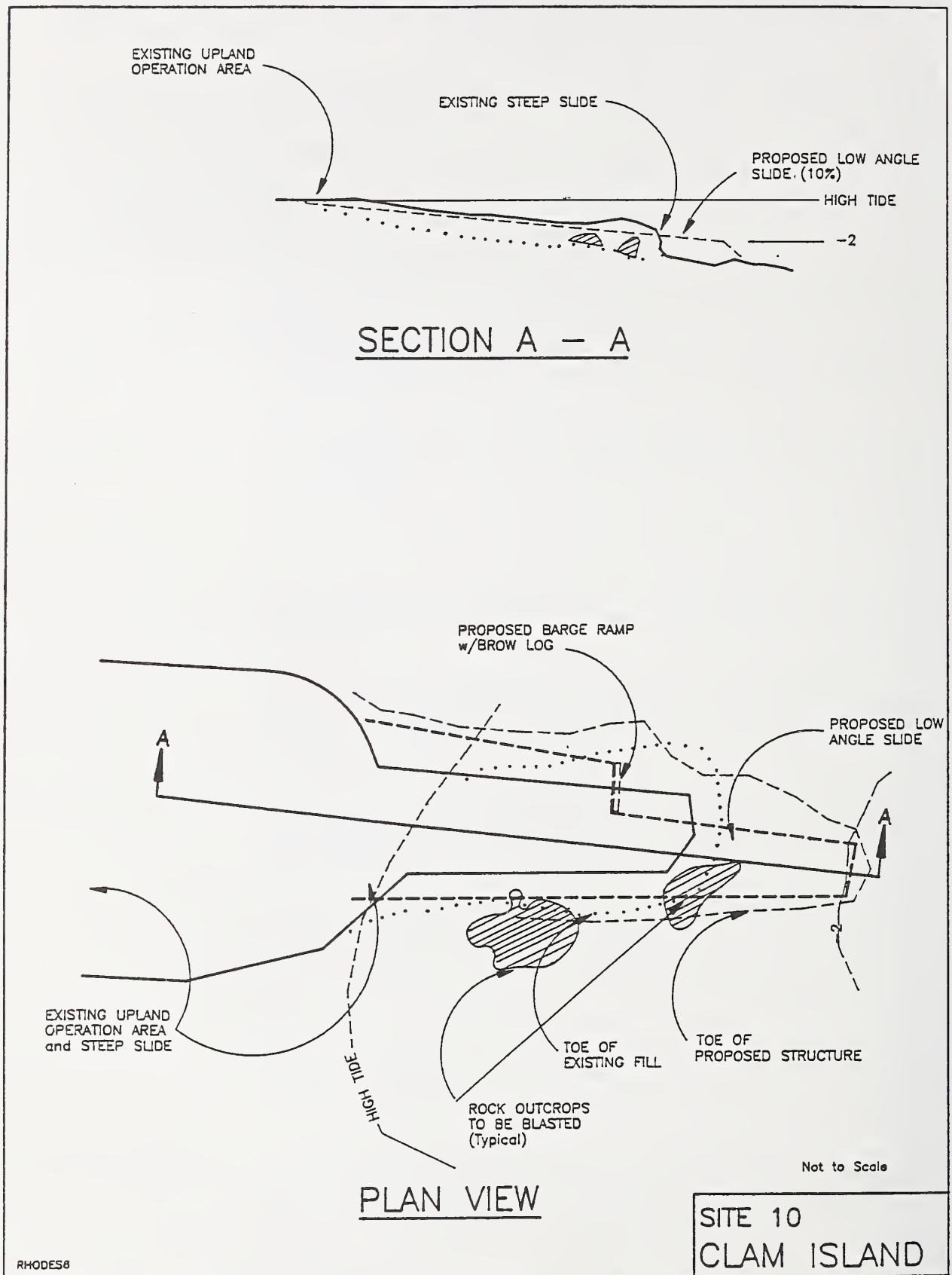
The site is visible from a narrow corridor in Neets Bay. The site lies in a narrow bight confining the visual angle.

Tideland Plans: There are no current tideland plans in this area.

Recommendations: Conduct a marine investigation to assess the current marine conditions.

Construct a low-angle slide as this site serves a very small isolated area that will require very few re-entry operations over the rotational harvest period.

This site will not facilitate use at +2 feet and lower tidal levels due to the nature of the beach.



SAME COVE Site #11

Location: NW 1/4 SE 1/4 Sec. 14, T. 70 S., R. 90 E. KTN D-5
55° 47' 52" N. 131° 34' 19" W.

Proposed Volume: 10 MMBF

Facility Type: Existing steep slide will require converting into an A-frame with bulkhead and guide rails. This site cannot be converted to a low-angle slide.

Upland Area: The site is situated in a small confined bowl-shaped area surrounded by high ridges. Additional area will need to be excavated to convert the site to an A-frame and bulkhead system.

Rafting Area: Ample rafting area with deep water. LTF site is protected from weather; However, the rafting area is somewhat more exposed.

Barge Off-Load: Initial off-loading can be done at the existing LTF. Subsequent landings can be accomplished adjacent to the LTF.

Camp Facilities: Same as for Sites #6, #7, #8, #9, and #10: No upland area is available for a land camp. Additionally, there are no adequate water sources near this site.

Access: The existing road will require major reconstruction. Some modification of the alignment may be necessary to convert the existing LTF to accommodate an A-frame system.

Marine Conditions: The site lies at the head of a small cove with depths of 50 to 60 feet. A large rock lies in the center of the cove which will confine towing operations.

The LTF site is protected from weather.

Fisheries: No cataloged fish streams are near the site.

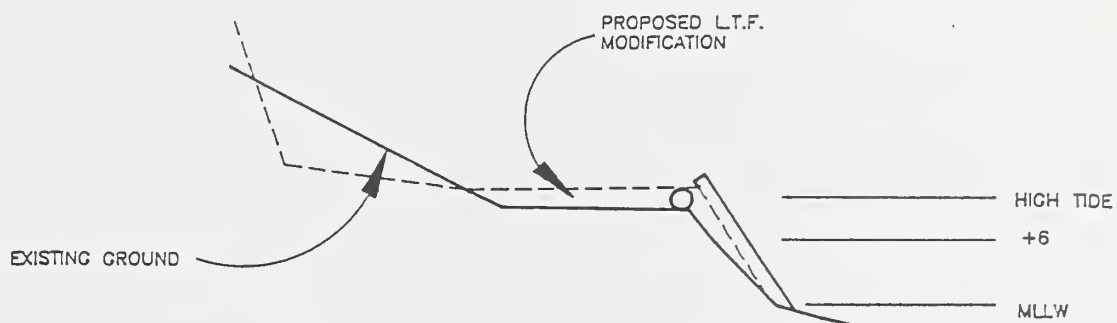
Other
Environmental: No eagle trees are near the site.

The site is visually obscured from Neets Bay due to its location in the small cove. The log rafts would be visible from the west 1/2 of Neets Bay as the log rafts would be located outside of the small cove.

Tideland Plans: There are no current tideland plans for this area.

Recommendations: Conduct marine investigation.

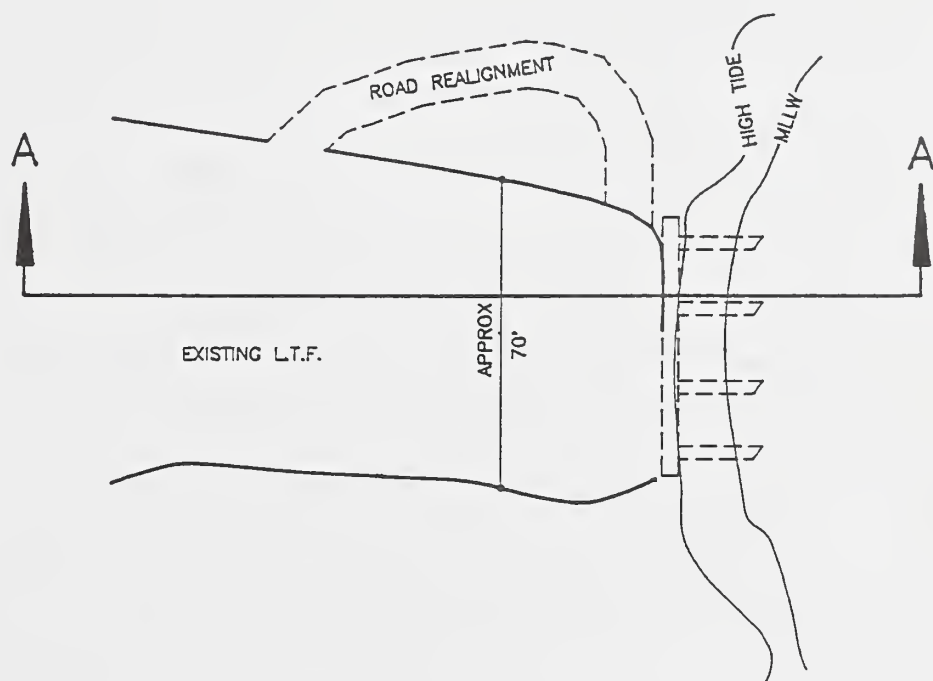
Construct an A-frame lift-off system with bulkhead and guide rails.



SECTION A - A

SOUNDINGS

26'	37'	42'
25'	50'	75'



PLAN VIEW

Not to Scale

SITE 11
SAME COVE

RHODESB

EASY Sites #12, #13, & 14

Location:

Site #12: SE 1/4 NW 1/4 Sec. 13, T. 70 S., R. 90 E. KTN D-5
55° 48' 05" N. 131° 33' 07" W.

Site #13: NW 1/4 NW 1/4 Sec. 13, T. 70 S., R. 90 E. KTN D-5
55° 48' 13" N. 131° 33' 12" W.

Site #14: NW 1/4 NW 1/4 Sec. 13, T. 70 S., R. 90 E. KTN D-5
55° 48' 16" N. 131° 33' 13" W.

These sites were investigated. However, the beach characteristics did not lend to development of either a low-angle slide or an A-frame lift-off system with bulkhead. The beach characteristics would require a very large footprints and embankments for an A-frame system. Low-angle slides could not be constructed at these sites because the beach does not provide sufficient runout for such structures. Also, these sites would require additional new road construction to reach the harvest areas.

EAST NEETS Site #15

Location: SE SW⁴ NW 1/4 Sec. 17, T. 70 S., R. 91 E. KTN D-5
55° 47' 34" N. 131° 29' 48" W.

Proposed Volume: 20 MMBF

Facility Type: Site #15 is situated within the Neets Bay fish hatchery operation. The existing LTF serves as access to several fish holding pens. This is an unauthorized situation as Site #15 is not within the special use permit area.

The site is adjacent to high-value estuarine habitat. Site #15 is relatively shallow.

Barge Off-Load: The fish holding pens are in the area that serve as a log booming and rafting operations originally.

Access: Three residential units, with associated children play areas, are located directly on the edge of the access road, leaving minimal clearance for trucks. This access route is the route that could serve as an eventual power transmission corridor access facility.

It is recommended that this site not be reactivated due to the proximity of high-value estuarine habitat, expected interference between fish holding pens, and rating operations and truck traffic through hatchery residential area.

EAST NEETS Site #15a

Location: NE 1/4 NE 1/4 Sec. 13 T. 70 S. R. 90 E. KTN D-5
55° 48' 19"N. 131° 32' 06" W.

Proposed Volume: 20 MMBF

Facility Type: Site #15a would accomodate an A-frame system. The site has a very steep sloped beach.

Upland Area:

Rafting Area:

Barge Off-Load

Camp Facilities

Access: Access would require 2.5 miles of additional road that would traverse several steep slopes to reach tidewater. It is feasible to connect East Neets Bay to the Shrimp Bay LTF by developing three miles of additional road. This road would need to be located between the 200 to 500 feet elevation to avoid numerous steep areas that a road to Site #15a would need to traverse.

The route to Shrimp Bay could also serve as a power transmission facility corridor. This would facilitate both timber resource management and power transmission facility construction and maintenance.

Marine Conditions:

Fisheries:

Other
Environmental:

Tideland Plans:

Recommendations: It is recommended that Site #15a is eliminated from further study to consolidate LTF sites, reduce additional difficult road development, and accommodate possible power transmission facilities.

FIRE COVE Site #16

Location: NW 1/4 NW 1/4 Sec. 25, T. 70 S., R 90 E. KTN D-5
 55° 46' 29" N. 131° 33' 19" W.

Proposed Volume: 70 MMBF

Facility Type: Existing A-frame lift-off system with bulkhead and guide rails.

The existing bulkhead and guide rails will require replacement. The original deep water rafting area will be used for this entry. An A-frame lift will need to be installed.

* * * * *

SOUTH WEST NEETS BAY Site #17

Location: SW 1/4 SW 1/4 Sec. 31, T. 70 S., R. 89 E. KTN D-6
 55° 45' 09" N. 131° 41' 24" W.

Proposed Volume:

Facility Type: Existing A-frame lift-off with bulkhead.

The existing facility will require minor repairs and re-installation of an A-frame.

The original deep water rafting site will again be used.

CHIN POINT Site #18

Location: SW 1/4 SE 1/4 Sec. 18, T. 71 S., R. 90 E. KTN C-6
55° 42' 22" N. 131° 40' 23" W.

Proposed Volume: 20 MMBF

Facility Type: Proposed low-angle slide. This facility serves a very small isolated harvest area.

Upland Area: The uplands are of moderate terrain which will allow development of an operating area.

Rafting Area: Rafting area can be developed immediately off shore from the site. This site depth of 120 feet and more.

Barge Off-Load: An initial landing site will need to be identified when an adequate rock source is found. After a road from rock source to LTF is developed, subsequent barge landings can be made adjacent to the LTF.

Camp Facilities: It is anticipated that this site will be served by a float camp in Margaret Bay. However, depending upon the operation logging this area, a float camp site may be needed near the site. A small float camp could be placed in a small bay north of Site #18.

Access: Access routes would be of moderate grades as the terrain adjacent to Site #18 is moderate. The State of Alaska has selected lands in this area. The selection has been approved by the Regional Forester. However, title has not been transferred to the State. The Forest Service will need to retain an easement for the LTF and roads in the selection. See attached map of the state selection area.

Marine Conditions: The beach contains large cobbles with rock outcrops. The beach drops at 11 percent for 125 feet. The bottom is of gentle slope for another 150 feet, then drops to very deep water. The lower end of the slide would be close to the point of where the bottom drops to extreme depths.

Fisheries: The nearest fish streams are 3/8 mile north and 1 mile west of the site. These are #101-90-02 and #101-90-19 respectively.

Other
Environmental: An eagle tree is located about 1/8 mile east of the site.

The site would be visible from Margaret Bay, the west 1/4 of Traitors Cove, and obscured from Behm Canal. This site is located outside of a small bay to the north. Rafting and transferring of logs would be as far from the bay as practical.

Tideland Plans: There are no current tideland plans for this area.

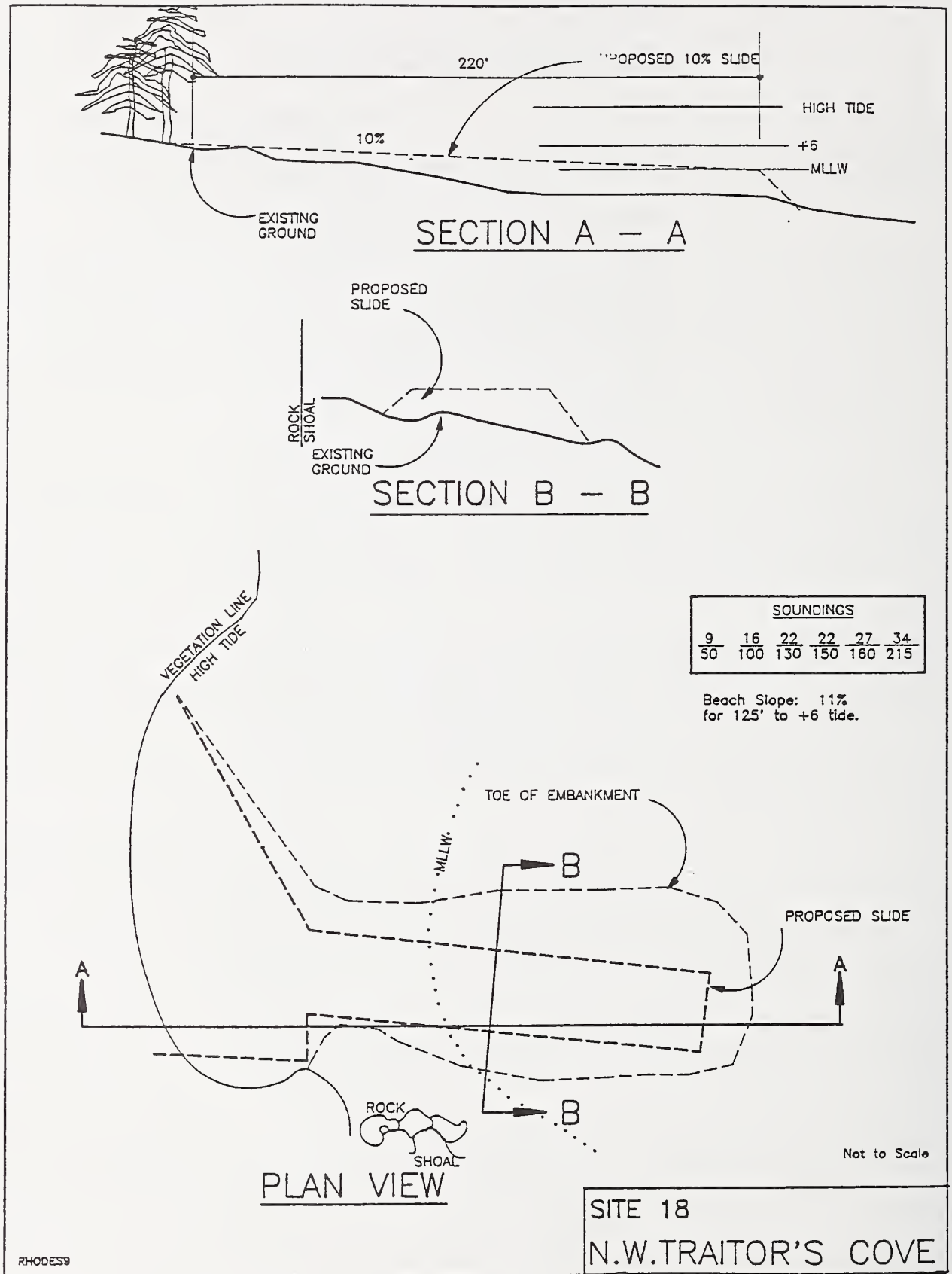
Recommendations: Conduct a marine investigation.

Develop this site as low-angle slide.

Sites #18 and #19 are tributary to this harvest area. Recommend using Site #18 as Site #19 would not support a low-angle slide and would require a large embankment and bulkhead footprint for an A-frame system. The slide system at Site #18 would be preferable as this is a small isolated area requiring small operations and equipment.

Verify the location of the eagle tree.

Initiate easement retention process.



NORTHWEST TRAITORS COVE Site #19

Location: SW 1/4 SE 1/4 Sec. 18, T. 71 S., R. 90 E. KTN C-6
 55° 42' 32" N. 131° 40' 19" W.

Proposed Volume: 20 MMBF

Facility Type: The terrain does not lend to either a low-angle slide or A-frame with bulkhead. The beach is too steep for a slide. However, a very large embankment would be required for an A-frame.

Site #19 is within a small bay and has an eagle tree.

Site #19 is tributary to the same area as site #18. Only one site is needed.

Recommendations: It is recommended that Site #19 not be considered further. The terrain, its location in a small bay, and the proximity to the eagle tree are not desirable features. Also, an A-frame system would not meet the needs for small operations.

* * * * *

NORTHWEST TRAITORS COVE #20 AND #21

Location Site #20: SW 1/4 SW 1/4 Sec. 8, T. 71 S., R. 90 E. KTN C-5. 55° 43' 21" N. 131° 39' 38" W.

Site #21: NW 1/4 SW 1/4 Sec. 8, T. 71 S., R. 90 E. KTN C-5. 55° 43' 30" N. 131° 39' 31" W

Facility Type: These sites were field investigated and found unsuitable for development as slides or A-frame with bulkhead systems.

Sites #20 and #21 were expected to serve the area tributary to Sites #20, #21, #22, and #23. From a photo map and cursory field reconnaissance, it appears that Sites #20 and #21 cannot be accessed from the area being harvested due to difficult terrain.

Recommendations: It is recommended that these sites not be considered further.

NORTH TRAITORS COVE Site #22

Location: SE 1/4 NE 1/4 Sec. 8, T. 71 S., R. 90 E. KTN C-5
55° 43' 44" N. 131° 38' 29" W.

Proposed Volume: 10 MMBF

Facility Type: A-frame with bulkhead and guide rails. The terrain and bathymetry do not lend to development of a slide.

Upland Area: The uplands are 35-to-40 percent slopes. Development of an operating area will require a large excavation.

Rafting Area: Rafting may require several stages due to the excessive water currents. This may include use of a log boom at the LTF site, then move each day's cut to a rafting site 3/8 mile southwest or 1/2 mile across Traitors Cove. Currents in the area are very heavy due to the outlet of the salt chuck 3/4 mile west of the site.

Barge Off-Load: Initial landings would be made at the site. Subsequent landings would be made adjacent to the LTF site.

Camp Facilities: It is anticipated this area will be served by a float camp at Margaret Bay. This would require a two mile boat commute.

No land camp areas are available at this site.

Access: The access route into Site #22 will be steep (18 percent and up and will have tight curves). Road cuts and LTF excavation will be large. The terrain the tributary area is very steep limiting opportunities to access the shore line.

Marine Conditions: The beach is very steep and Traitors Cove is over 100 feet deep in this area. Tidal currents are very strong due to the outlet of the salt chuck 1/2 mile east of the site. This will insure flushing.

An eagle tree is located 1/4 mile southwest of the site.

Fisheries: Nearest cataloged fish streams are 1/2 mile east and west of the site.

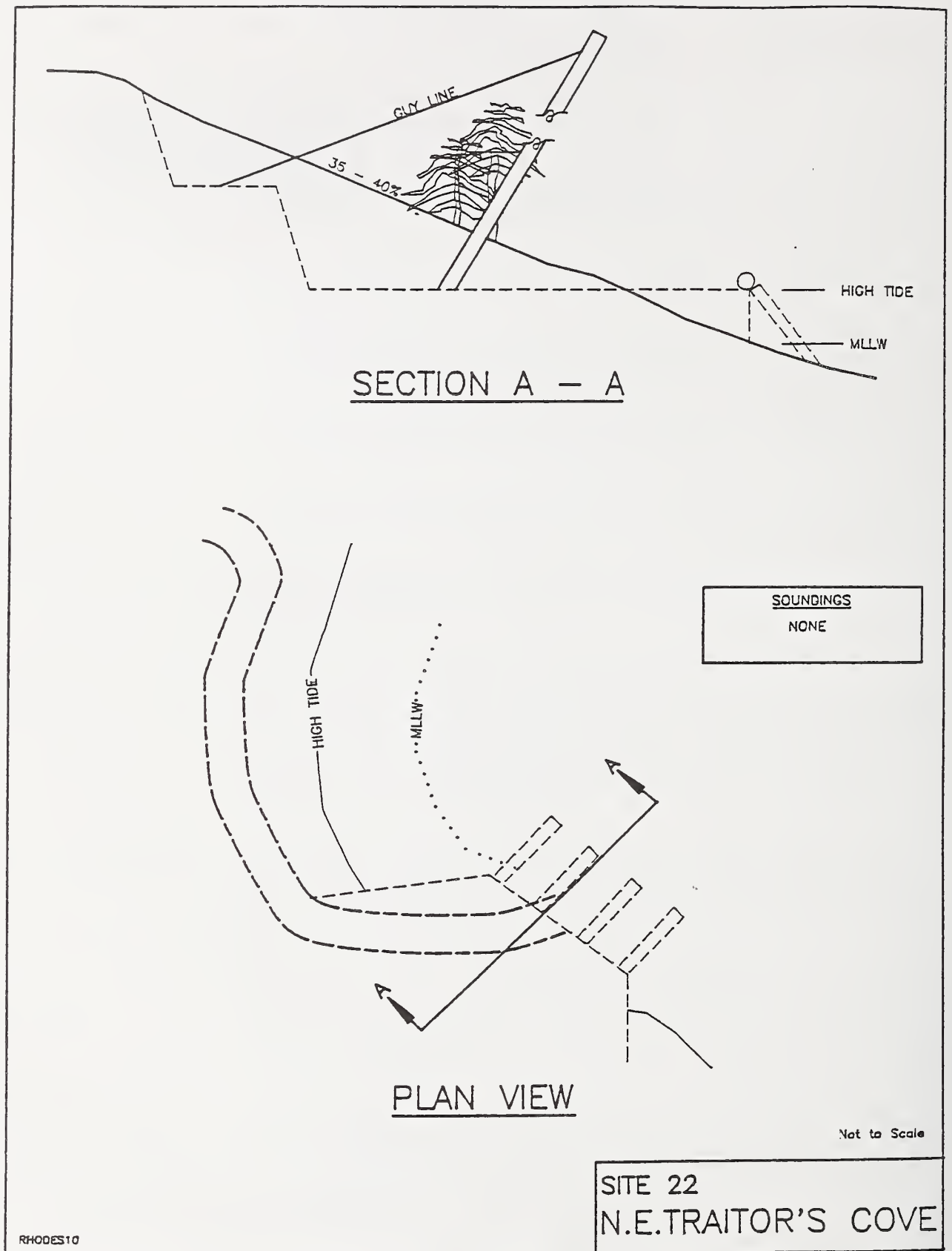
Other

Environmental: Visually, Site #22 can only be seen from the west end of Traitors Cove. Visitors viewing the "gate," outlet of the salt chuck, will be able to see both the LTF and access road. Site #22 is obscured from the main body of Traitors Cove.

Tideland Plans: There are no current tideland plans for this area.

Recommendations: Conduct a marine investigation for the site and a segregated rafting area.

Due to the tight configuration of the LTF and access road concerning alignment and grade, it is recommended that field road location be accomplished prior to selection of this site. It appears that Site #23 is more roadable than Site #22.



NORTH TRAITORS COVE Site #23

Location: NW 1/4 NW 1/4 Sec. 9, T. 71 S., R. 90 E. KTN C-5
 55° 43' 57" N. 131° 38' 01" W.

Proposed Volume: 10 MMBF

Facility Type: A-frame with bulkhead and guide rails. The terrain does not lend to use of a flow-angle slide.

Upland Area: The upland area contains steep slopes of 35-to-40 percent. Development of an operating area will require a large rock cut.

Rafting Area: Rafting may require several stages due to excessive water currents. This might include use of a log boom at the LTF site, then move each day's cut to a rafting area 3/4 mile southwest or 1/2 mile southeast across the bay.

Barge Off-Load: Initial and subsequent barge landings can be accomplished adjacent to the site.

Camp Facilities: Same as for Site #22: The access route will be steep (18 percent and up and will have tight curves). Road cuts and LTF excavation will be large. The terrain the tributary area is very steep limiting opportunities to access the shore line.

Access: The access route entering the operating will be at about 12 percent grade.

Site #23 is situated to take advantage of a small valley that allows a route to access the tributary harvest area via more desirable terrain. Such access opportunities in this tributary harvest area are very limited due to the extensive steep terrain in the area.

Marine Conditions: The beach is of large cobbles on 35 percent side slope. Tidal currents are very strong at the site due to the outlet of the salt chuck 1/2 mile southeast of the site. This will insure flushing.

Fisheries: Cataloged fish stream #101-90-22 lies approximately 100 feet east of the site.

Other
 Environmental: Site #23 will be visible from part of the central portion of Traitors Cove and highly visible from directly east of the salt chuck outlet. The shoreline is steep which provides favorable characteristics for minimizing the footprint on the tidelands.

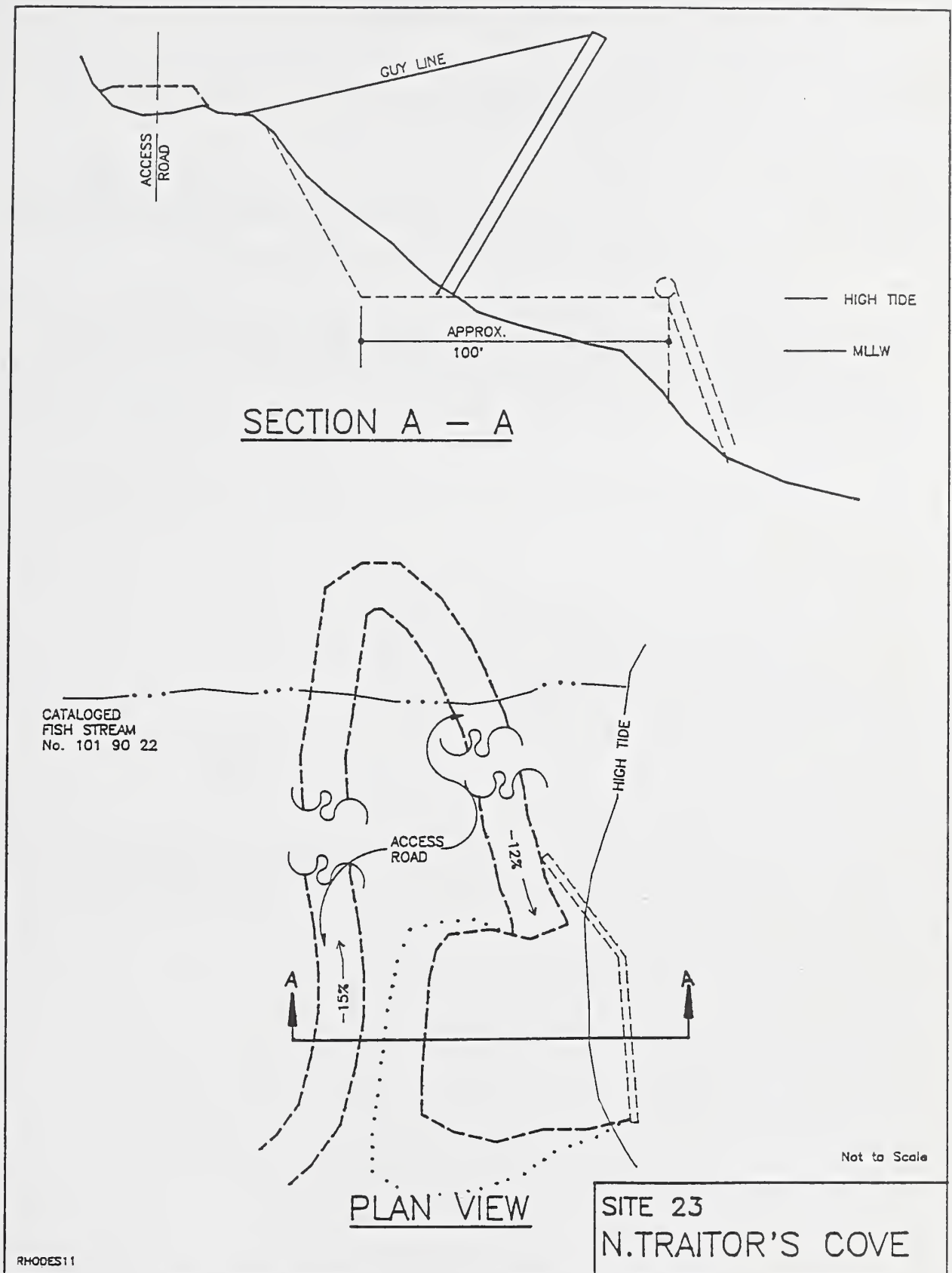
APPENDIX G

Tideland Plans: There are no current tideland plans for this area.

Recommendations: Conduct a marine investigation for the site and a segregated rafting area.

Verify proximity of fish stream #101-90-22 with respect to the site.

Site #23 is the preferred site due to suitable access opportunities.



MARGARET BAY Site #24

Location: SW 1/4 NW 1/4 Sec. 21, T. 71 S., R. 90 E. KTN C-5
55° 42' 04" N. 131° 38' 01" W.

Proposed Volume: 81 MMBF

Facility Type: Existing A-frame lift-off with bulkhead and guide rails.

This facility is currently in operation.

The existing facility is located on Forest Service lands within a State selection area. Easements have been retained for both the LTF and Forest access roads within the selection area.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

National Marine Fisheries Service

P.O. Box 21668

Juneau, Alaska 99802-1668

June 17, 1992

Mr. James Rhodes
U.S. Forest Service, Ketchikan Area
Federal Building
Ketchikan, Alaska 99901

Dear Mr. Rhodes:

Enclosed are the results of the May 1992 log transfer facility investigations for Thorne Island, Stevenson Island, Hassler Island, and Neets Bay and Traitors Cove on Revillagigedo Island. If you have any questions regarding the report you may contact Duane Petersen in Juneau at 586-7235.

Thank you for your support and cooperation during the site investigations.

Sincerely,

Steven T. Zimmerman, Ph.D., Chief
Protected Resources Management Division

cc: FWS, Juneau, Ketchikan
ADFG Habitat, Juneau, Ketchikan
EPA, Anchorage



U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Protected Resources Management Division
Juneau, Alaska

and

U.S. Department of the Interior
Fish and Wildlife Service
Southeast Alaska Ecological Services
Juneau, Alaska

Report of Field Investigations
Thorne Island, Stevenson Island, Hassler Island, and Neets Bay
and Traitors Cove on Revillagigedo Island

May 11-14, 1992

In response to a request from Mr. James Rhodes, Ketchikan Area, USDA Forest Service (FS), personnel from the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) investigated, in concert, the intertidal/subtidal habitats of locations in Whale Passage and Kashevarof Passage (Figure 1), and Behm Canal (Figure 2), for proposed log transfer facilities (LTF). Copies of aerial photographs of the proposed LTF sites are shown in Appendix A.

Our records show that an investigation of other potential LTF sites on Thorne Island and Stevenson Island was done in September 1976. A copy of that report is enclosed for your information.

Over the years the timber industry has employed the technique of placing logs in marine waters, constructing log rafts, storing the rafts, and towing rafts to processing centers. While not always obvious, a significant bark loss results from such activities. What happens to the dislodged bark is dependent on numerous variables, but most often bark is found to accumulate in areas of high log handling activity in quantities sufficient to smother bottom dwelling organisms. The effects of such losses can be reflected through the food chain.

There are two approaches to lessening the harmful effects of concentrated bark deposits: 1) to select sites where prevailing features or conditions will facilitate bark dispersal, and 2) to select sites which display relatively low biological resource value. Our site selection techniques are designed to consider each approach, and where possible, identify sites which satisfy criteria for both.



Figure 1. Proposed Log Transfer Facility Sites on Thorne Island and Stevenson Island. Underwater investigations

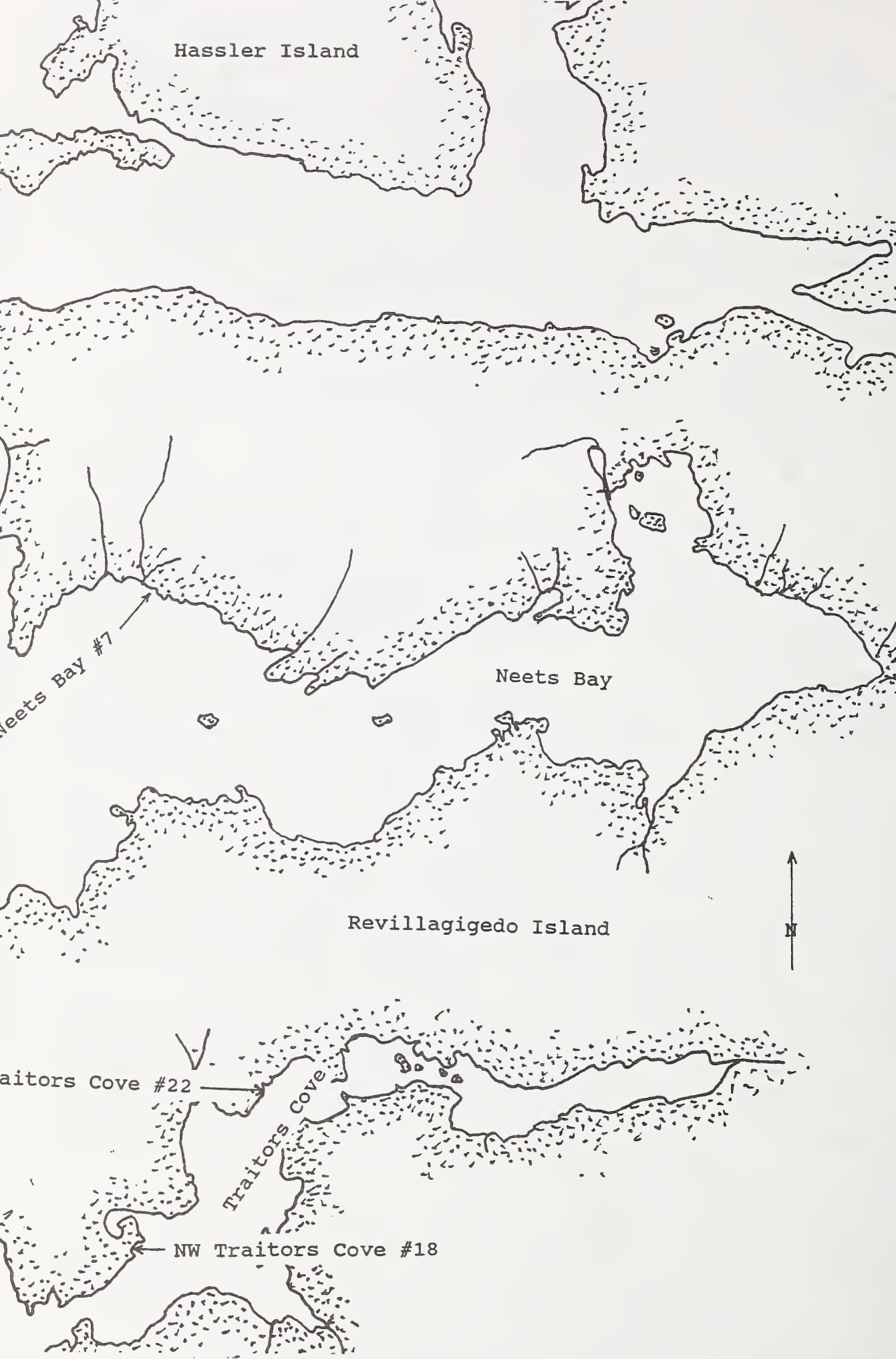


Figure 2. Proposed Log Transfer Facility Sites on Hassler Island, in Neets Bay and Traitors Cove, Revillagigedo Island. Underwater investigations conducted May 1992.

OBJECTIVES

Investigations were directed at achieving the following study objectives:

1. Investigate subtidal habitat at potential log transfer sites to determine: a) the physical characteristics including depth, slope, substrate, and current patterns; and b) the biological characteristics of productivity and diversity.
2. Analyze information collected on each site, and compare results both with the Timber Task Force log transfer facility siting guidelines¹ and with results on other nearby sites.
3. Present a recommendation relative to the use of the investigated sites for log transfer activities.

METHODS

A transect line, 100-meters long, was extended seaward from the proposed site perpendicular to the shoreline. Self Contained Underwater Breathing Apparatus (SCUBA) was employed to gather intertidal/subtidal information along the transect line as well as in the general area of potential impact. Observations of physical and biological characteristics were made at 5-meter intervals along the transect line. Observations included water depth, substratum composition, plant species, animal species, and obvious changes in zonation. In addition, the general characteristics of the area, and evidence of current flow patterns, or the lack thereof, were noted subjectively.

RESULTS AND RECOMMENDATIONS

A discussion for each area investigated follows. Species observed in each area are listed in Table 1.

W. Thorne Island

The investigation occurred on the west side of Thorne Island. A bottom profile of the underwater transect is shown in Figure 3. The physical attributes of the site are characterized as being shallow, 11.1-meters deep at the end of the transect. Substratum is composed of bedrock/cobble from the extreme high water line to 40 meters from shore giving way to a silt/cobble bottom to the end to the transect. Flushing potential is low as evidenced by the presence of silt within the bottom composition.

¹1985, Log Transfer Facility Siting, Construction, Operation and Monitoring/Reporting Guidelines, Governor's Timber Task Force.

Substrate Types

Bedrock- BR
 Boulder- B
 Cobble - C
 Pebble - P
 Sand - S
 Silt - SL

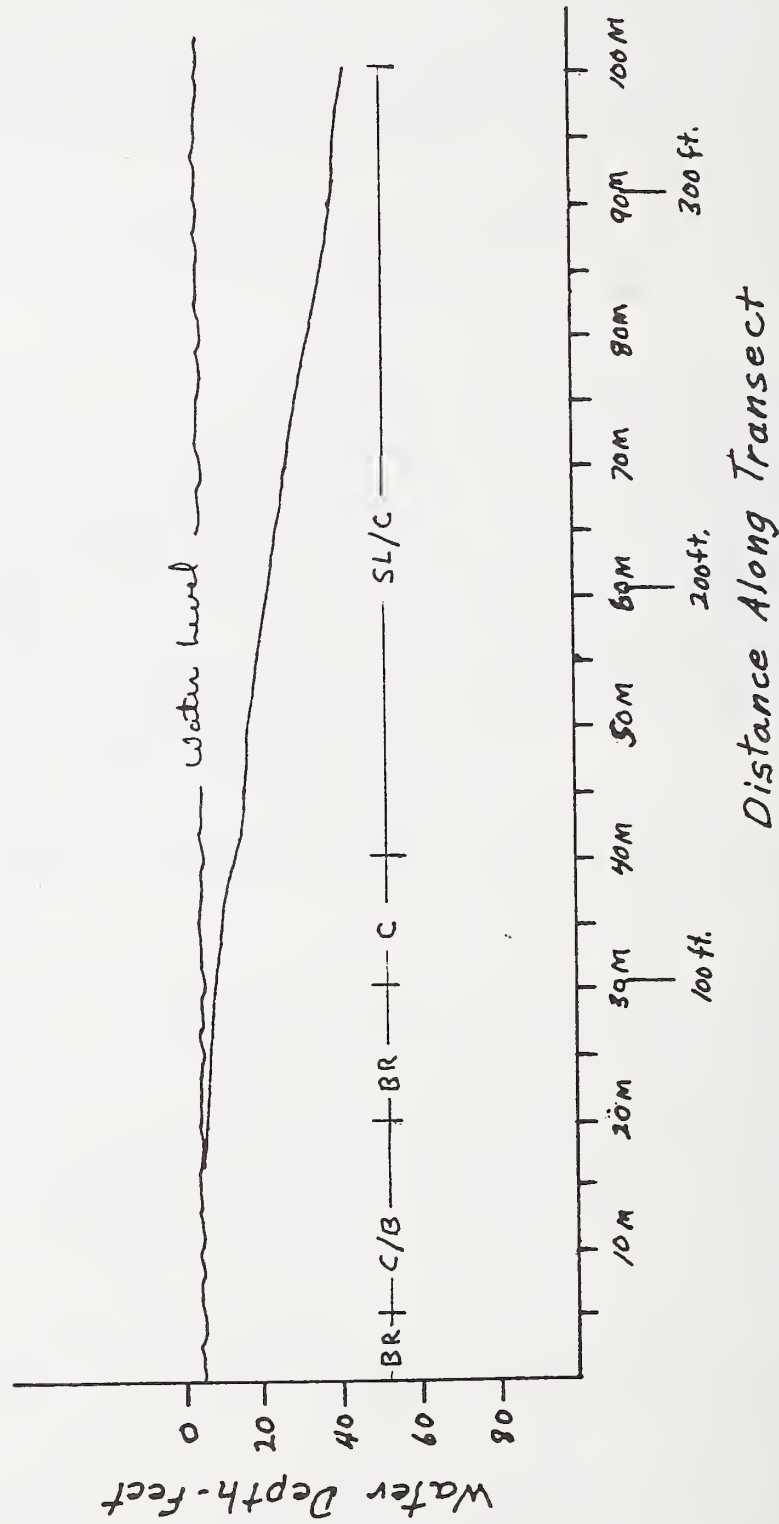


Figure 3. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at W Thorne Island #1, May 11, 1992.

Table 1. List of plant and animal species observed along underwater transects at Thorne Island (A), Stevenson Island (B), Hassler Island (C), N.W. Neets Bay (D), N.W. Traitors Cove (E), and N. Traitors Cove (F), May 11-14, 1992.

Aquatic Plants	Common Name	A	B	C	D	E	F
<u>Agarum cribrosum</u>	Brown algae			x		x	x
<u>Alaria marginata</u>	Brown algae	x	x				
<u>Constantinea simplex</u>	Red algae						x
<u>Desmarestia spp</u>	Brown algae	x	x	x		x	x
<u>Enteromorpha intestinalis</u>	Green algae				x	x	
Filamentous Brown	Brown algae			x		x	x
Filamentous Green	Green algae		x				
<u>Fucus spp</u>	Brown algae	x	x	x	x	x	x
<u>Halosaccion glandiforme</u>	Red algae	x					
<u>Laminaria spp</u>	Brown algae	x	x	x		x	x
<u>Lithothamnium spp</u>	Encrusting algae					x	x
<u>Odonthalia spp</u>	Red algae	x	x	x			x
<u>Palmeria spp</u>	Red algae	x				x	x
<u>Ralfsia pacifica</u>	Brown algae		x				x
<u>Ulva/Monostroma spp</u>	Green algae	x	x	x		x	x
<u>Zostera marina</u>	Eelgrass				x	x	

Aquatic Invertebrates	Common Name	A	B	C	D	E	F
<u>Archidoris ohdeneri</u>	White doris					x	
<u>Balanus spp</u>	Barnacle	x	x	x	x	x	x
<u>Cancer productus</u>	Red rock crab			x			
<u>Ceratostoma foliatum</u>	Foliated Thorn Purpura		x	x			x
<u>Chlamys spp</u>	Pink scallop					x	x
<u>Cnemidocarpa finmarkiensis</u>	Smooth red tunicate						x
<u>Collisella pelta</u>	Shield limpet	x	x	x		x	x
<u>Corella willmeriana</u>	Glass tunicate			x			
<u>Coryphella spp</u>	Small eolis					x	
<u>Cucumaria miniata</u>	Orange sea cucumber		x			x	x
<u>Dendronotus dalli</u>	Dall's fron eolis						x
<u>Dermasterias imbricata</u>	Leather star					x	x
<u>Elassochirus tenuimanus</u>	Big-clawed hermit crab				x	x	x
<u>Evasterias troschelii</u>	Molted star	x	x			x	
<u>Fusitriton oregonensis</u>	Oregon triton					x	
<u>Halocynthia aurantium</u>	Sea peach						x
<u>Hyas lyratus</u>	Lyre crab		x			x	x
Limpet	Limpet	x	x			x	x
<u>Mediaster aequalis</u>	Vermillion star						x
<u>Metridium senile</u>	Fine-tentacled anemone	x				x	
<u>Mytilus edulis</u>	Blue mussel	x	x	x		x	x
<u>Ophiura spp</u>	Serpent stars		x				
<u>Oregonia gracilis</u>	Decorator crab		x		x	x	
<u>Orthasterias koehleri</u>	Spiney star			x		x	x
<u>Pachycerianthus fimbriatus</u>	Tube anemone				x		x

Table 1. (Continued) List of plant and animal species observed along underwater transects at Thorne Island (A), Stevenson Island (B), Hassler Island (C), N.W. Neets Bay (D), N.W. Traitors Cove (E), and N. Traitors Cove (F), May 11-14, 1992.

Aquatic Invertebrates	Common Name	A	B	C	D	E	F
<u>Pagurus spp</u>	Hermit crab	x	x	x	x	x	x
<u>Pandalus danae</u>	Dock shrimp	x	x				x
<u>Pandalus platyceros</u>	Spot shrimp		x				
<u>Parastichopus californicus</u>	Mop sea cucumber	x	x	x		x	x
<u>Pisaster brevispinus</u>	Pink short-spined star				x		x
<u>Ptilosarcus gurneyi</u>	Sea pen						x
<u>Pteraster tessellatus</u>	Slime star						x
<u>Pycnopodia helianthoides</u>	Sunflower star	x	x			x	x
<u>Serpula vermicularis</u>	Common serpulid	x	x	x		x	x
Snail	Snail	x	x	x	x	x	x
<u>Strongylocentrotus d.</u>	Green sea urchin		x				
<u>Telmessus cheiragonus</u>	Horse crab	x				x	x
<u>Thais spp</u>	Snail	x	x				
<u>Tonicella spp</u>	Chiton						x x
Marine Fish	Common Name	A	B	C	D	E	F
<u>Lumpenus sagitta</u>	Snake prickleback	x					
<u>Pholis laeta</u>	Crescent Gunnel	x					
<u>Hexagrammos spp</u>	Greenling					x	x
<u>Sebastes spp</u>	Rockfish						x
<u>Lepidopsetta bilineata</u>	Rock sole					x	

Animal and plant species observed were those common to this type of habitat. Species variety was low with barnacles (Balanus spp), mussels (Mytilus edulis) being most abundant. The most abundant algae species noted was the brown algae Laminaria spp.

This site does not meet the Timber Task Force LTF siting guidelines for water depth and potential bark accumulation. However, the site is low in overall productivity and we would not have any objection to the construction and operation of a LTF at this location.

Stevenson Island, Site #2

The site is exposed to the north. A bottom profile of the underwater transect is shown in Figure 4. The physical attributes of the site are characterized as a shallow slope of cobble and bedrock to 60 meters (water depth of 8.4 meters) from the extreme high tide line. From 60 meters to the end of the transect the bottom is composed of silt with a mix of cobble. Water depth at the end of the transect was 16.5 meters. Flushing potential is low at the end of the transect as evidenced by the silty bottom. Flushing along the first 60 meters should be good because of exposure to the north and rock bottom.

Animal and plant species observed were those common to this type of habitat with one exception, the spot shrimp (Pandalus platyceros). Overall species abundance and variety was low with barnacles (Balanus spp), and the sea mop cucumber (Parastichopus californicus) being most abundant. The two most abundant algae species noted were Fucus spp and Laminaria spp.

This site does not meet the Timber Task Force LTF siting guidelines for water depth because of the shallow sloping bottom and for the potential for bark accumulation along the last 40 meters of the transect. However, biological productive is low and this location is appropriate for the construction and operation of a LTF.

Hassler Island, Site # 1

The underwater investigation occurred about 945 meters northwest of the existing LTF. A bottom profile of the transect is shown in Figure 5. The physical attributes of the site are characterized as a very shallow slope (5.1 meters deep at the end of the transect). The bottom is comprised of bedrock and a cobble/pebble mixture to 35 meters from the extreme high water line. From 35 meters to the end of the transect, the bottom was composed of sand with a few pebbles. Flushing potential would be moderate as evidenced by the presence of clean sand.

Animal and plant species observed were common to this type of habitat. Species variety was low with barnacles (Balanus spp) and snails being most abundant. The most abundant algae was Laminaria spp. Eelgrass (Zostera marina) occurred in a dense

Substrate Types

Bedrock- BR
 Boulder- B
 Cobble - C
 Pebble - P
 Sand - S
 Silt - SL

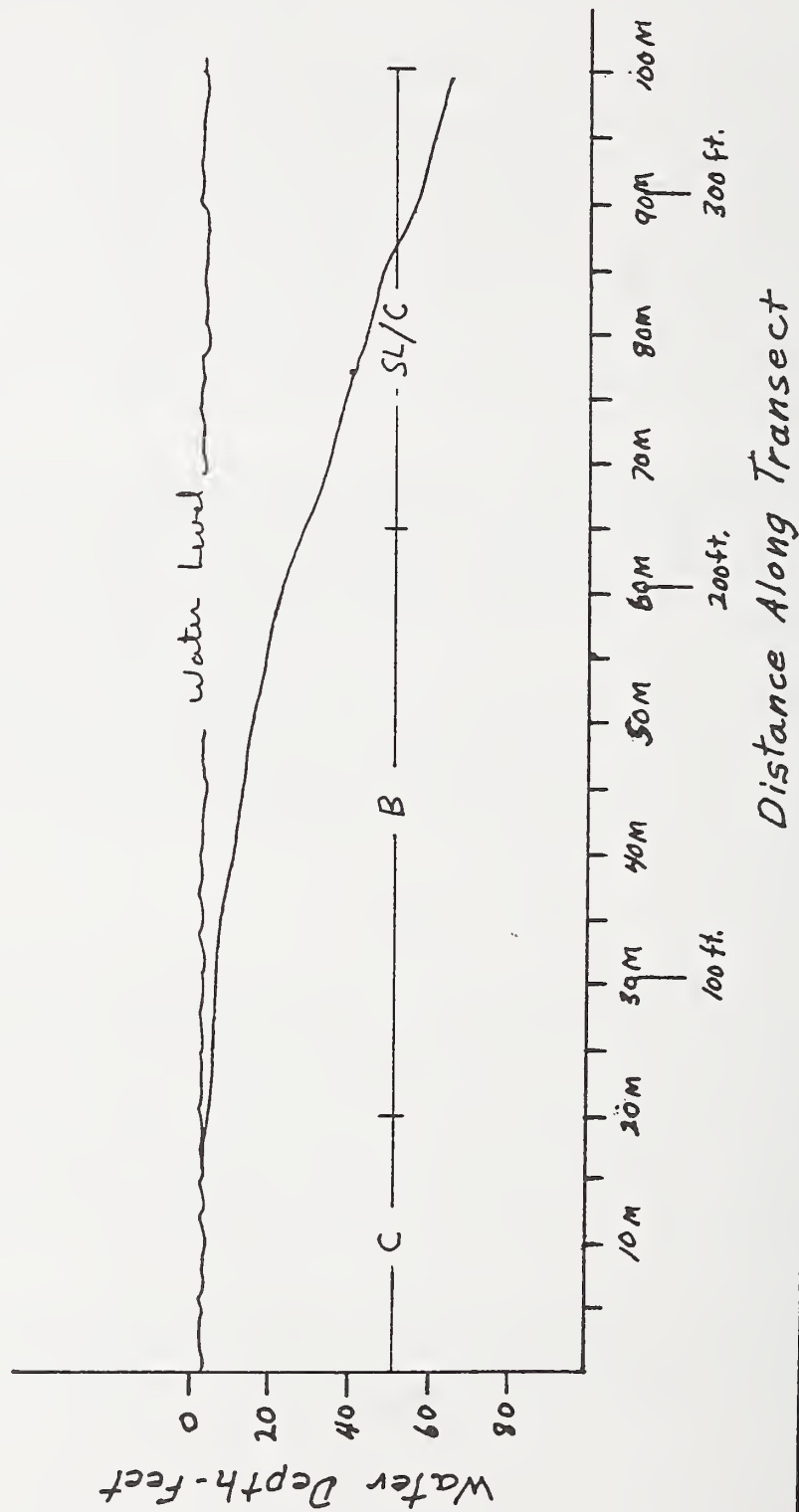


Figure 4. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at Stevenson Island #2, May 12, 1992.

Substrate Types

Bedrock- BR
 Boulder- B
 Cobble - C
 Pebble - P
 Sand - S
 Silt - SL

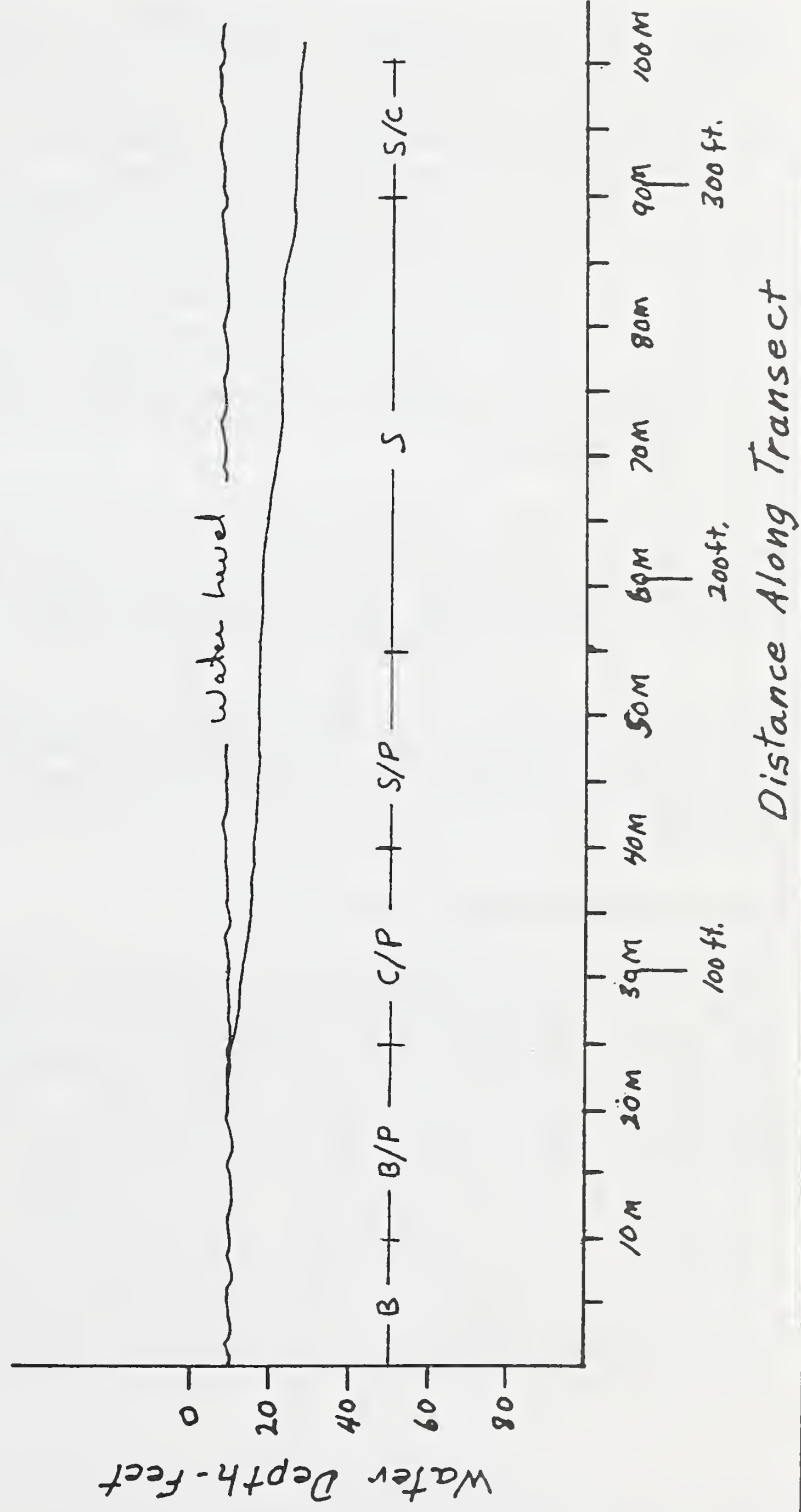


Figure 5. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at Hassler Island #1, May 12, 1992.

band from 42 meters from the extreme high tide line to 93 meters along the transect.

This site does not meet the Timber Task Force LTF siting guidelines, including the criteria for water depth and site productivity. We recommend this site not be used for the transfer of timber. Use of the existing facility is preferred.

N.W. Neets Bay, Site #7

The previously used LTF, N.W. Neets Bay #6 is on a cataloged anadromous fish stream, therefore, we conducted an underwater investigation of this alternative location. The transect began at the extreme high tide line. Physical attributes of the site are characterized as a cobble substratum to 40 meters grading into sand to the end of the transect. The slope is shallow with a water depth of 5.1 meters at 80 meters along the transect tape. Beyond 80 meters the slope increased rapidly with a depth of 13.5 meters at the end of the 100-meter long transect tape and beyond. The last 10 meters of the transect was covered with logging debris. It was evident that log storage occurred in this area in the past. With exposure to the south, flushing potential is good to the drop-off, about 85 meters from shore, as evidenced by the lack of silt within the bottom material. A bottom profile is shown in Figure 6.

Animal and plant species observed were few. Abundance was low in both animal and plant species. A sparse band of eelgrass occurred from the 75 meter mark to the 87 meter mark of the transect line. The most abundant animal species noted were snails and barnacles in the intertidal zone.

This site meets the Timber Task Force Guidelines for siting of a LTF except for the shallow slope. However, with little biological productivity noted in the area we find this site suitable for the construction and operation of a log transfer facility.

N.W. Traitors Cove, Site #18

This site was the most productive of the sites visited on the trip. Extensive beds of blue mussels (Mytilus edulis) and barnacles (Balanus spp) inhabited to intertidal and shallow subtidal. Commercial quantities of sea cucumbers (Parastichopus californicus) were noted in the area. The large macrophytes Laminaria spp and Agarum cribrosum covered the rocky bottom. A bottom profile of the transect is shown in Figure 7. Physical attributes of the site are characterized as being moderately sloping with a water depth of 14.1 meters at the end of the transect. The substratum is composed of cobble/pebble/bedrock to the 50 meter mark on the transect line which graded in a sand/boulder/cobble to the end of the transect. No current was noted during the investigation and logging debris is not expected to disperse.

Substrate Types

Bedrock- BR
 Boulder- B
 Cobble - C
 Pebble - P
 Sand - S
 Silt - SL

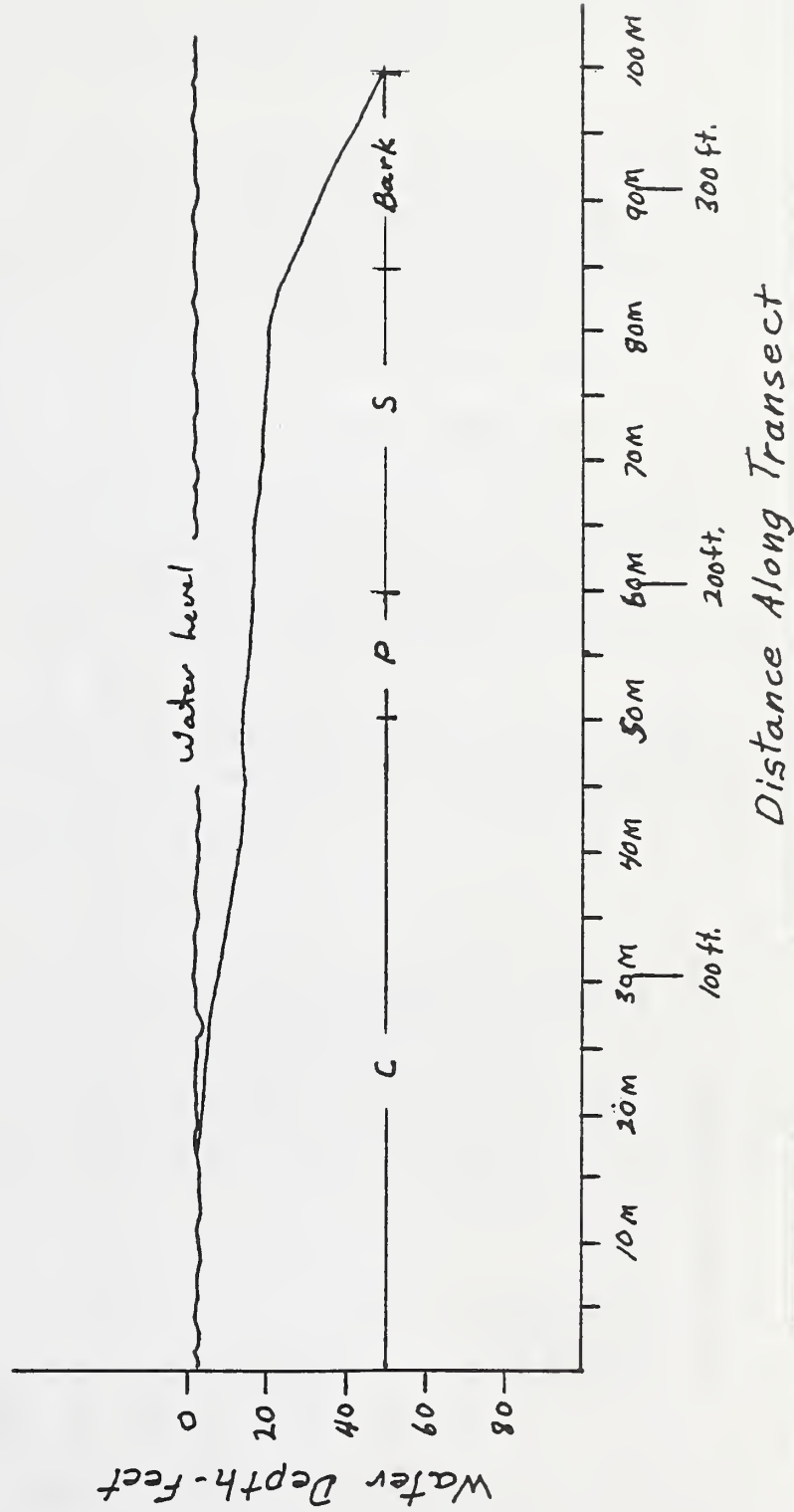


Figure 6. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at NW Neets Bay #7, May 13, 1992.

Substrate Types

Bedrock- BR
 Boulder- B
 Cobble - C
 Pebble - P
 Sand - S
 Silt - SL

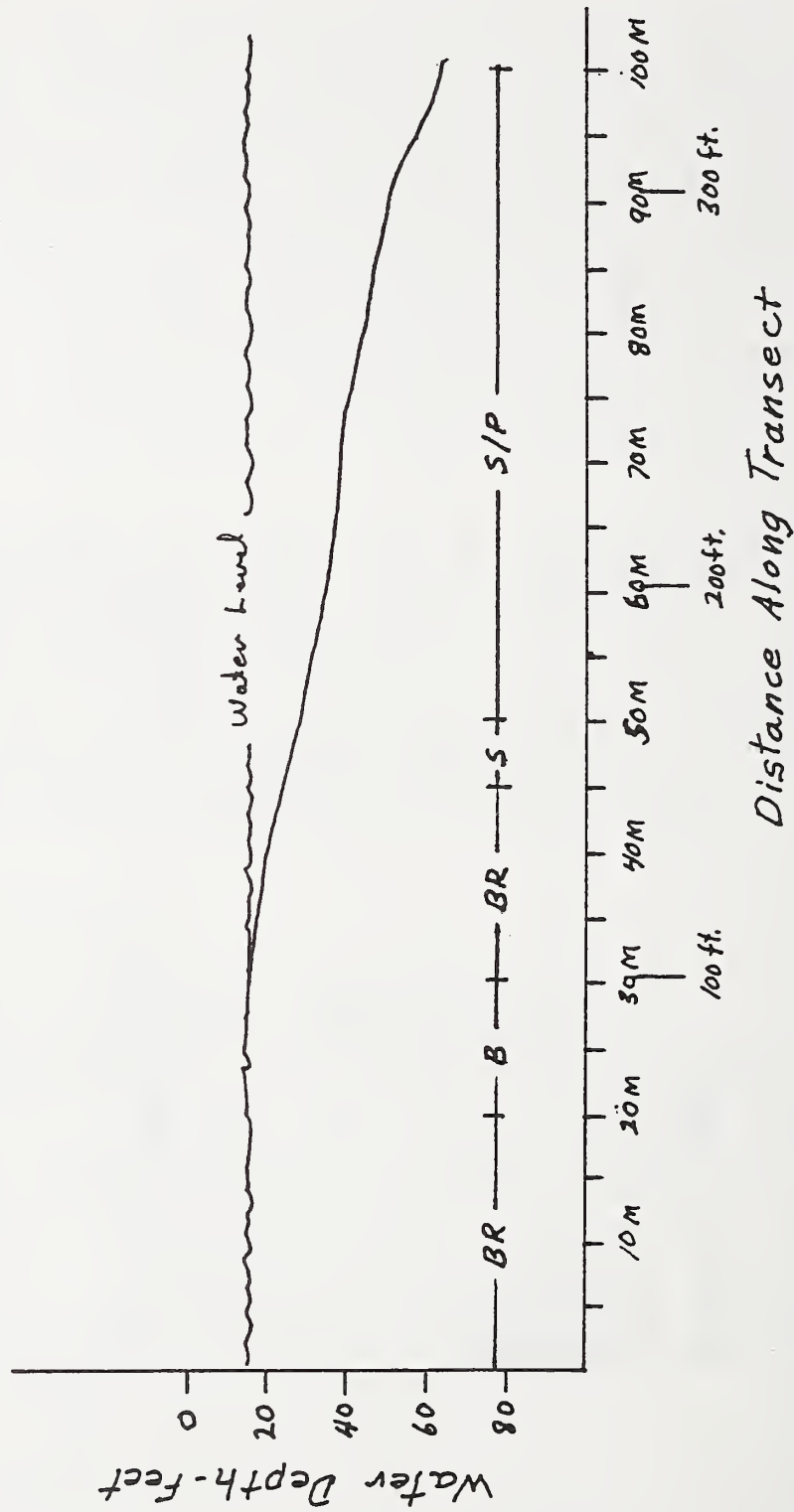


Figure 7. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at NW Traitors Cove #18, May 13, 1992.

This site is very productive in terms of biomass. Plant and animal species are diverse and numerous. This site does not meet the Timber Task Force LTF siting guidelines, including the criteria for water depth, site productivity, and potential bark accumulation. We do not recommend construction of a LTF at this site. However, if the LTF is moved to the southwest shore of the bight the footprint of the LTF would be significantly smaller. This would reduce the bottom area covered which will reduce the effects of LTF construction on the aquatic environment. The exact location of the preferred site along with its alignment was coordinated with Jim Rhodes, USDA Forest Service.

N. Traitors Cove, Site #22

A bottom profile of the underwater transect is shown in Figure 8. The physical attributes of the site are characterized as being with a fairly constant slope. Water depth was 19.5 meters at the end of the transect. Substratum is composed of bedrock from the extreme high water line to 40 meters giving way to a sand/pebble bottom to the end of the transect. Flushing potential is moderate as evidenced by the presence of a sandy bottom.

Animal and plant species observed were those common to this type of habitat. Commercial quantities of the sea cucumber (Parastichopus californicus) were noted in the area. Species variety was normal with the sea cucumber and the tube anemone (Pachycerianthus fimbriatus) being most abundant. The most abundant algae species noted were the brown algae Agarum cribrosum and Laminaria spp. The encrusting algae Lithothamnion spp covered much of the exposed bed rock surface.

Biologically, this site is quite productive and does not meet the Timber Task Force LTF siting guidelines because of the large number of sea cucumbers. However, we believe with the amount of timber proposed to be transferred, this site is appropriate for the construction and operation of a LTF.

CAVEAT

The recommendations of the proposed sites indicated as suitable for LTFs are based upon observations of estuarine habitat made during a limited time period. It should be noted the observations over time were not made and as a result, seasonal changes in habitat use, including fish and shellfish spawning occurrences were not observed. Further, recommendations offered relate to aquatic observations only. Use of adjacent uplands by animals or birds, including bald eagles, was not considered.

Substrate Types

Bedrock- BR
 Boulder- B
 Cobble - C
 Pebble - P
 Sand - S
 Silt - SL

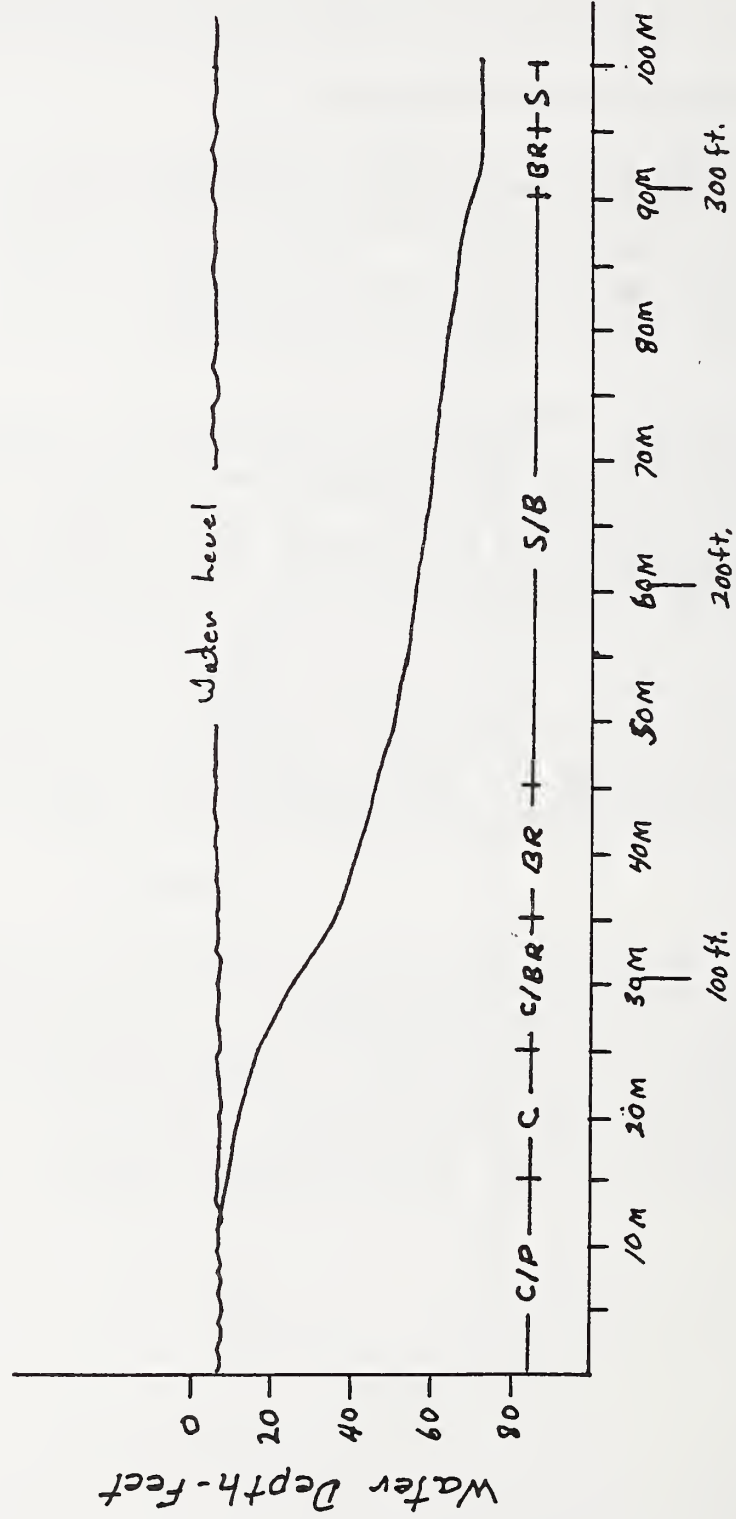


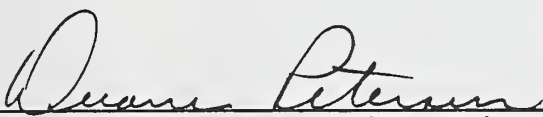
Figure 8. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at N Traitors Cove #22, May 14, 1992.

ACKNOWLEDGEMENTS

Duane Petersen, NMFS Juneau, Alaska, Chuck Osborn, FWS Ketchikan, and Ed Grossman, FWS Juneau, Alaska, were the principle investigators for these field investigations and were responsible for preparation of this report.

Jim Rhodes, FS Ketchikan, Alaska, represented the FS. Richard Guhl, FS Ketchikan, Alaska, served as skipper aboard the FS vessel M/V Tongass Ranger.

NATIONAL MARINE FISHERIES SERVICE

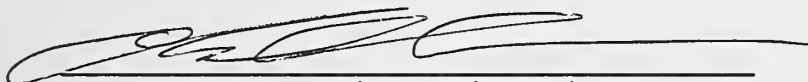


Duane H. Petersen, Diver/Biologist

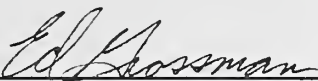


Steven T. Zimmerman, Ph.D., Chief
Protected Resources Management Division

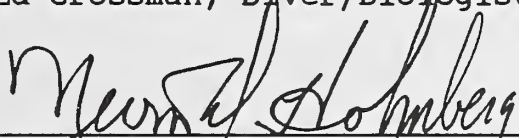
U.S. FISH AND WILDLIFE SERVICE



Chuck Osborn, Diver/Biologist



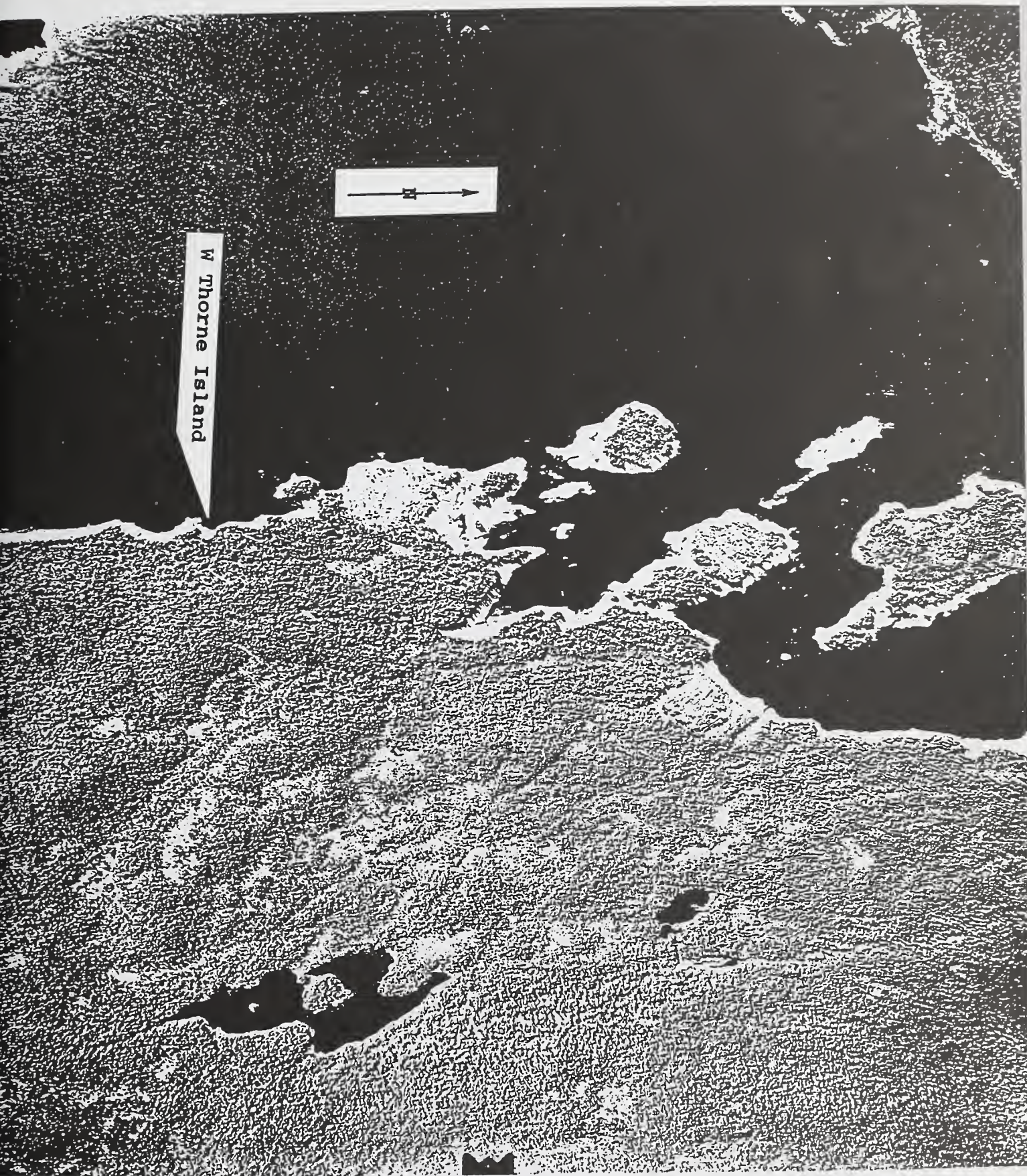
Ed Grossman, Diver/Biologist



Nevin D. Holmberg, Field Supervisor
Ecological Services, Juneau, Alaska

APPENDIX A

Aerial Photographs of Proposed Log Transfer Facility Sites



Appendix A-1. W Thorne Island proposed LTF location.



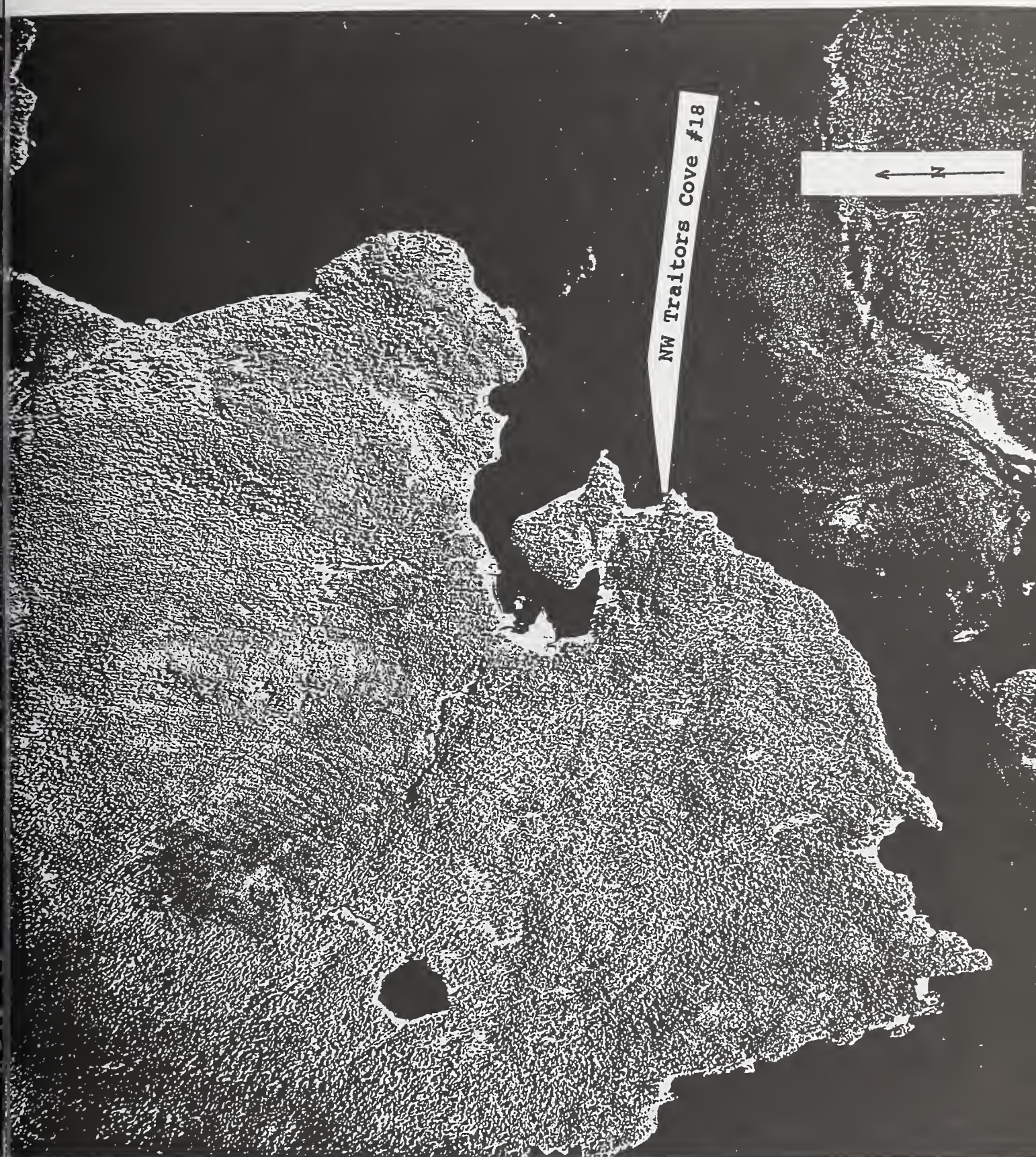
Appendix A-2. Stevenson Island proposed LTF location.



Appendix A-3. Hassler Island #1 proposed LTF location.



Apendix A-4. NW Neets Bay #7 proposed LTF location.



Appendix A-5. NW Traitors Cove #18 proposed LTF location.



Appendix A-6. N Traitors Cove #22 proposed LTF location.

LOG TRANSFER SITE EVALUATION

Log transfer sites were selected and evaluated with respect to the interagency Log Transfer Siting Guidelines. Following are the siting guidelines used to evaluate both new and existing Log Transfer Sites.

SITING GUIDELINES

Proximity to Rearing and Spawning Areas: Siting of log storage and transfer facilities within 300 feet of mouths of anadromous fish streams or in areas known to be important for fish spawning or rearing is normally prohibited.

Protected Locations: Log transfer and log raft storage facilities should be sited in weather protected waters with bottoms suitable for anchoring and at least 20 acres for temporary log storage and booming.

Upland Facility Requirements: Log transfer facilities should be sited near at least five acres of relatively flat uplands. There should also be a body of water sufficient to provide a minimum of 60 linear foot facility face.

Safe Access to a Facility From the Uplands: To provide safe access to the log transfer facility and adjoining log sort yard, the facility should be sited where access roads can maintain a grade of 10 percent or less for trucks and four percent specialized equipment.

Bark Dispersal: Log transfer facilities should be sited along or adjacent to straits and channels or deep bays where currents may be strong enough to disperse sunken or floating wood debris. Siting log transfer facilities in embankments with sills or other natural restrictions to tidal exchange should be avoided.

Site Productivity: Sites for in-water storage and/or transfer of logs should be located in areas having the least productive inter-tidal and sub-tidal zones.

Sensitive Habitats: Log transfer facilities and log raft storage areas should not be sited on or adjacent to extensive tide flats, flat marshes, kelp, or eel grass beds, seaweed harvest areas, or shellfish concentration areas.

Safe Marine Access to Facilities: Log rafting and storage facilities should be accessible to tug boats with log rafts at most tides and on most days.

Storage and Rafting: Logs, log bundles, or log rafts should be stored in areas where they will not ground at low tide. A minimum depth of forty feet or deeper, measured at mean lower low water (MLLW), for log raft storage is preferred.

Avoid Bald Eagle Nest Trees: Site log transfer facilities to avoid Bald eagle nests. No project construction or operations should be closer than 330 feet to any Bald Eagle nest tree.

Additional interagency guidelines concerning LTF site construction and monitoring are included in Appendix E.

Existing sites were examined in accordance with the interagency siting guidelines to evaluate current adequacy. The existing sites do not necessarily meet all guides. For instance, several sites within the Project Area may be located within 300 feet of an anadromous fish stream.

An additional log transfer siting guideline dealing with recreation and visual considerations is as follows: log transfer facilities should be located where conflicts with existing boat anchorages will be minimized and views of the facility will be considered as seen from travel routes and use areas.

Table A-1 presents an evaluation of each site considered. Not that an N indicates that the site does not meet an individual guideline, accordingly a Y indicates that it does meet the individual guideline. An OK indicates that though the site does not fully meet an individual guideline, it is workable or a compromise.

In the case of Siting Guidelines S6 and S7, numerical evaluations are estimated on a scale of 1 to 10, 10 being high sensitivity or productivity, and 1 being low sensitivity or productivity.

Table A-1

LOG TRANSFER SITE EVALUATION

Alaska Timber Task Force Siting Guidelines

Site Status Name and Number	S1	S2	S3	S4	S5	<u>1/</u> S6	<u>1/</u> S7	S8	S9	S10
P Hassler N. 1	Y	Y	Y	Y	OK	7	6	Y	Y	Y
E Hassler 2	Y	OK	OK	Y	Y	5	5	Y	Y	Y
E Dress Point 3	Existing - Not used in any alternatives									
E Klu Bay 4	Existing - Not considered for relocation									
E Shrimp Bay 5	Existing - Current tideland lease									
E Chin Point 6	N	OK	Y	Y	OK	7	6	OK	Y	Y
P N.W. Neets 7	Y	OK	Y	Y	OK	7	5	OK	Y	Y
E N.W. Neets 8	Y	OK	N	Y	N	6	5	OK	Y	Y
P N.W. Neets 9	Y	OK	N	Y	N	6	5	OK	Y	N
E Clam Island 10	Existing - Not used in any alternatives									
E Same Cove 11	Existing - Not used in any alternatives									
D Easy 12	Y	Y	Y	N	OK	5	5	Y	Y	Y
D Easy 13	Y	Y	Y	N	OK	5	5	Y	Y	Y
D Easy 14	Y	Y	Y	N	OK	5	5	Y	Y	Y
E E. Neets 15	Y	Y	N	Y	N	9	9	OK	Y	Y
P E. Neets 15(a)	Y	Y	Y	Y	Y	4	4	Y	Y	Y
E Fire Cove 16	Existing - Current tideland lease									
E S.W. Neets 17	Existing - Current Tideland lease									
P N.W. Traitors 18	Y	Y	Y	Y	OK	7	5	Y	Y	Y
P N.W. Traitors 19	Y	Y	Y	Y	OK	8	6	Y	Y	Y
P N.W. Traitors 20	Y	Y	Y	Y	N	7	9	Y	Y	Y
P N.W. Traitors 21	Y	Y	Y	Y	N	7	9	Y	Y	Y
P N. Traitors 22	Y	N	N	Y	Y	7	5	Y	Y	Y
P N. Traitors 23	N	N	N	Y	Y	7	7	Y	Y	Y
E Margaret Bay 24	Existing - Current tideland lease									

1/ High productivity or sensitivity = 10. Low productivity or sensitivity = 1 on a scale of 1 to 10.

2/ Rafting would interfere with SSRA operations and facilities.

EVALUATION OF LOG TRANSFER FACILITIES
Using 404(b)(1) Guidelines of the Clean Water Act

NORTH REVILLA PROJECT

US Forest Service
Tongass National Forest
Ketchikan Area
Ketchikan Alaska

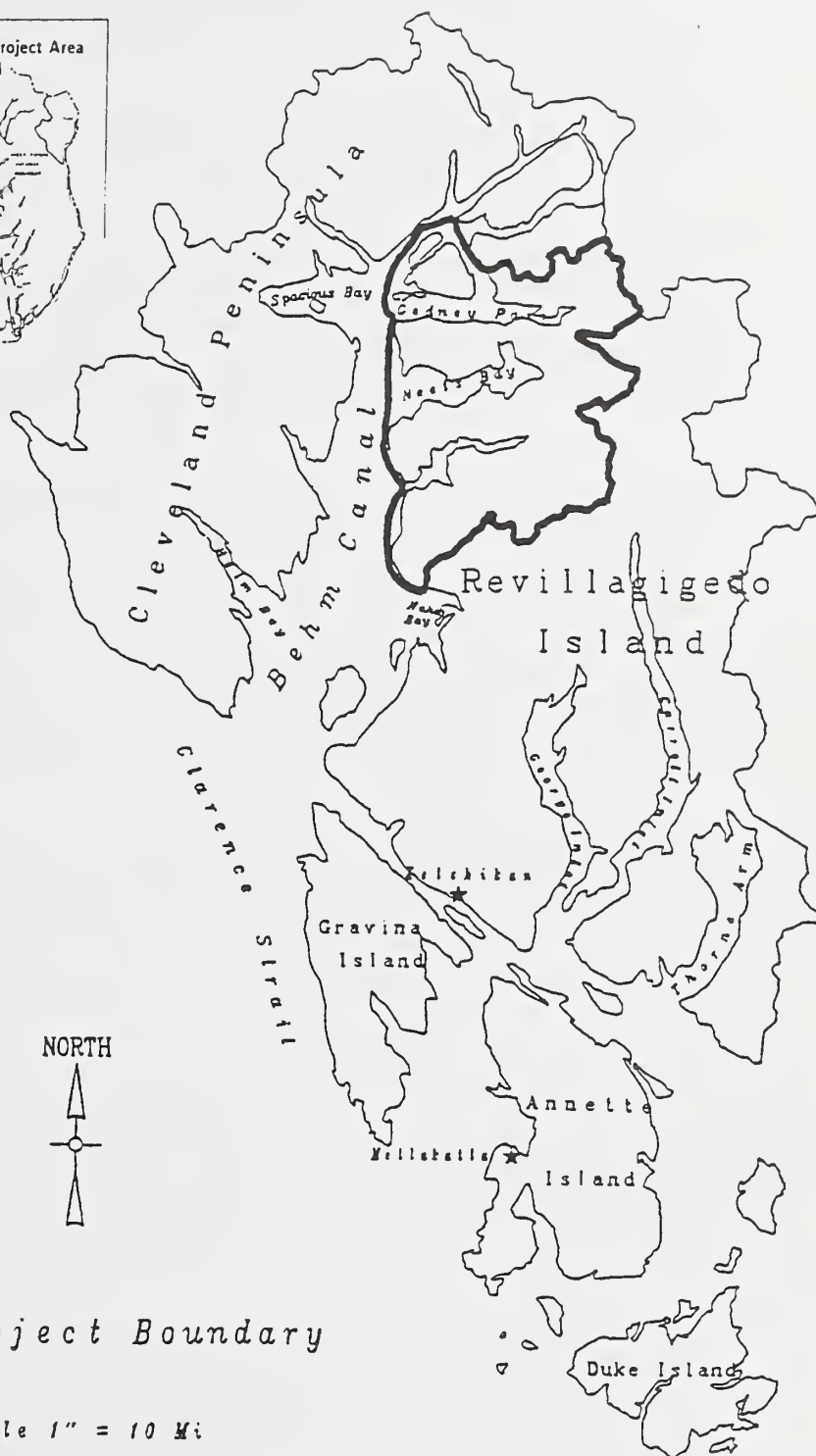
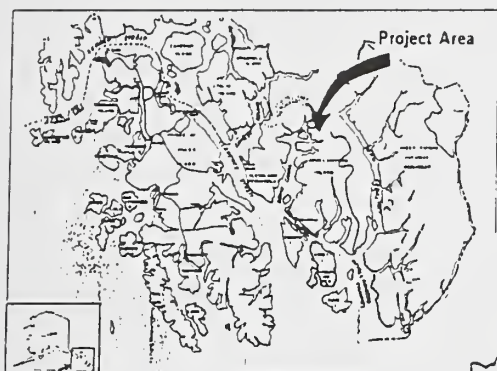
Jan. 12, 1993
Rev. May 15, 1993

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ATTACHMENTS

- A. Project Area Log Transfer Sites
- B. Hassler Island - Shrimp Bay Area LTF Sites
- C. Neets Bay LTF Sites
- D. Traitors Cove LTF Sites



— Project Boundary

Scale 1" = 10 Mi

The 109,520 acre Project Area is located approximately 30 miles north of Ketchikan

EVALUATION OF LOG TRANSFER FACILITIES
Using 404(b)(1) Guidelines of the Clean Water Act.

Guidelines governing siting, construction, operation and monitoring of log transfer facilities (LTF) under 40 CFR 230.12(a)(3) read as follows:

V. Log Transfer Facilities Siting, Construction, Operation, and Monitoring

A. Site log transfer facilities in locations which will best avoid or minimize potential impacts on water quality, aquatic habitat and other resources. During site analysis, cooperate with State and Federal agencies per stipulations in Memoranda of Understanding or cooperative agreements to assemble required data and evaluate alternatives.

Evaluate alternatives using the 404(b)(1) guidelines to determine if "(i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences; or (ii) The proposed discharge will result in significant degradation of the ecosystem; or (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem; or (iv) There does exist sufficient information to make a reasoned judgement as to whether the proposed discharge will comply with these guidelines.

Log Transfer Facilities under the various action alternatives for the North Revilla project were evaluated on the basis of items i through iv noted above. That evaluation is presented in subsequent discussions.

Specific Log Transfer (LTF) site locations are contained in Attachments A through D.

REACTIVATION OF HASSLER ISLAND LTF SITE #2

Includes modifying the existing LTF to a Single A-Frame lift-off system with bulkhead and guide rails. See Attachment B.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

Hassler Island contains one existing LTF that will require reactivation or relocation.

Hassler Island contains 1847 acres of harvestable timber, of which 843 acres are proposed for harvest.

Site #1 was field investigated, however, the site was eliminated due to presence of high value marine habitat and to retain upland and marine impacts at the previously impacted site.

Alternatives to reactivation of Hassler Island LTF:

No action alternative: No harvest of timber resources on Hassler Island.

Relocate LTF

Sub-alternatives to the proposed LTF modification:

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

Low-angle ramp

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to 1847 acres of timber resources would be forgone.

Relocate LTF: Relocation of the LTF to Site #1 would create new impacts to an undisturbed portion of the aquatic habitat. Haul and fuel use would be less than that of the existing site. The cost of site #1 would be \$164,600. Savings in haul and construction would be about \$41,500 and \$400,000 respectively. Site #1 would be developed as a low-angle ramp.

Reactivate Existing LTF: (Preferred Alternative) Reactivation of the existing LTF includes modification of the existing steep slide to a single A-Frame system. This will require relocation of the approach road, extension of the fill, and installation of a bulkhead and guide rails. The road relocation will effect 0.5 acres of forested wetlands, and the extension of the fill may increase the existing footprint by 0.1 acre in the aquatic habitat.

Impacts to the aquatic habitat would be retained in a previously impacted area. Haul and fuel use would be slightly higher than for Site #1. Haul and additional construction costs would be \$41,500 and \$565,000 respectively.

Sub-alternatives to the proposed LTF modification:

Dry Land Bulkhead to Barge Transfer: Modification of the existing site for barge loading would require construction of a 3- to 5-acre sort yard, relocation of the access road, and expansion of the existing fill with bulkhead to deep water.

The barge system will effect 4 to 6 acres of forested wetlands, 0.2 acres of fill in aquatic habitat and cost approximately \$1,000,000. Haul and fuel use would be about the same as modification of the existing site to an A-frame system.

Chain Slide System: Modification to a chain slide would require relocation of the access road, removal of most of the existing fill and expansion of the upland operating area due to loss of the fill area. This would effect about 1.5 acres of forested wetlands and about 0.2 acres of aquatic habitat associated with fill and slide structure. Road and LTF construction costs would be about \$627,000. Fuel use and haul would be the same as the proposed action.

Low-Angle Ramp: Modification to a low-angle ramp could not be accommodated due to the upland topographic and steep bathymetric characteristics.

Determine if: (ii) **The proposed discharge will result in significant degradation of the aquatic ecosystem;**

Hassler Island #2 is an existing site that has steep bathymetric characteristics with strong tidal currents that will provide good flushing characteristics.

The proposed single A-Frame system is capable of transferring logs at entry velocities of 3ft/sec and less. This capability will minimize discharge of bark into the aquatic ecosystem.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State National Pollution Discharge Elimination System (NPDES) programs, see 40 CFR 123.25.)

Determine if: **(iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;**

The existing site will adapt to a single A-Frame system with the least impact to both the uplands and aquatic ecosystems. The single A-Frame system is capable of controlling entry velocities to 3ft/sec and under.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25).

The National Marine Fisheries Service and U.S. Fish and Wildlife Service recommended using the existing site. See attached National Marine Fisheries and US Fish and Wildlife agencies report.

The reconstruction of the existing site into a single A-Frame and bulkhead is preferred to relocation or modification into other systems.

Hassler Island is small, resulting in short periodic use periods throughout the 100 year rotation. A low-angle ramp would be most economical for such intermittent operations if the site would accommodate the ramp. The next most economical method is the single A-Frame system.

REACTIVATION OF KLU BAY LTF Site# 4

Includes reconstruction of the the existing LTF by replacing the single A-Frame lift-off system, bulkhead and guide rails. See Attachment B.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

The Klu Bay LTF is an existing facility requiring reactivation or relocation.

The area tributary to the Klu Bay LTF includes Klu and Klam Creek drainages.

The tributary area contains 2106 acres of harvestable timber, of which 932 acres are proposed for harvest.

Alternatives to reactivation of Klu Bay LTF:

No action alternative: No harvest of timber resources in Klu and Klam Creek drainages.

Relocate LTF

Connect Klam and Klu Creeks to Shrimp Bay LTF Site #5

Connect Klam and Klu Creeks to Dress Point LTF Site #3

Sub-alternatives to the proposed LTF reconstruction:

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

Low-angle ramp

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to 2106 acres of timber resources would be foregone.

Relocate LTF: Relocation of the LTF would create new impacts to an undisturbed portion of the aquatic habitat. The upland topography and bathymetry in Klu Bay is very steep making relocation non practicable. No environmental advantages would be gained due to the difficulty of the terrain.

Reactivate the existing LTF Site #4: (Preferred Alternative)
Reactivation of the existing LTF will require the least impact on both the uplands and aquatic ecosystems. Using the single A-Frame method with replacement of the brow and guide rails minimizes the need for expansion of the fill and operating area. This option will cost about \$292,400.

Connect Klam and Klu Creeks to Shrimp Bay LTF: This would require 2.5 miles of road on excessively steep side slopes. Almost all of the route would be massive rock cuts. This route would impact the Orchard Lake and falls area which is proposed for management as a non-roaded area.

Generally forest roads cost \$130,000 to \$200,000 to build. A connection to Shrimp Bay would cost in excess of \$400,000 per mile for a total of over \$1,000,000. The route would disturb about 45 acres of productive land.

This alternative would increase fuel use and haul costs by \$142,000. The total additional cost for connecting to and using Shrimp Bay LTF would be over \$1,000,000 more than reactivating Klu Bay LTF.

From a visual standpoint, high impacts would be expected due to massive full bench cuts and possible mass failures on extremely steep slopes.

Connect Klu and Klam Creeks to Dress Point LTF Site #3: This alternative would have the same impacts as the connection to Shrimp Bay, only more so quantitatively due to the additional length of the road. The Dress point connection would be 5 miles long, of which 2.5 miles would be on excessively steep side slopes. The additional construction cost of this alternative would be approximately \$1,372,000.

The additional haul cost would be about \$284,000. Fuel use would be more than the Shrimp Bay connection or the proposed Klu Bay LTF reactivation.

Sub-alternatives to the proposed reconstruction of the LTF:

Dry Land Bulkhead to Barge Transfer: Modification of the existing site for barge loading would require construction of a 3- to 5-acre sort yard about 1 mile east of the LTF and expansion of the existing fill with a large bulkhead to reach deep water.

The barge system will effect 4 to 6 acres of flood plain, 0.1 additional acres of fill in aquatic habitat and cost approximately \$1,000,000. Haul and fuel use would be about the same as re-activation of the existing site to an A-frame system.

Chain Slide System: Due to steep topography and bathymetry, modification to a chain slide would require removal of much of the existing fill and expansion of the upland operating area due to loss of the fill area. The slopes adjacent to the operating area are excessively steep which would increase risk of mass failures if undercut. Construction costs would be about \$427,000. Haul costs would be the same as the proposed action.

Low-Angle Ramp: Modification to a low-angle ramp could not be accommodated due to the upland topography and steep bathymetry to seaward.

Determine if: (ii) **The proposed discharge will result in significant degradation of the aquatic ecosystem;**

Klu Bay Site #4 is an existing site that has steep bathymetric characteristics with strong tidal currents and depths of 80 to 90 feet. This will allow bark to move to depths below 60 feet.

The proposed single A-Frame system is capable of transferring logs at entry velocities of 3ft/sec and less. This capability will minimize discharge of bark into the aquatic ecosystem.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25.)

Determine if: (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;

The existing site will adapt to a single A-Frame system with the least impact to both the uplands and aquatic ecosystems. The single A-Frame system is capable of controlling entry velocities to 3ft/sec and under.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25.)

The reconstruction of the existing site into a single A-Frame and bulkhead with guide rails is preferred to relocation or modification into other systems.

Klu Bay LTF serves a small isolated area resulting in short periodic use periods throughout the 100 year rotation. A low-angle ramp would be most economical for such intermittent operations if the site would accommodate the ramp. The next most economical method would be the single A-Frame system. The A-Frame also provides the least additional impacts to both the uplands and the aquatic ecosystem.

REACTIVATION OF SHRIMP BAY LTF Site #5

Includes reconstruction of the the existing Shrimp Bay LTF. Reactivation would be accomplished by replacing the single A-Frame lift-off system, bulkhead and guide rails. See Attachment B.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

The Shrimp Bay LTF is an existing facility requiring reactivation or relocation.

The area tributary to the Shrimp Bay LTF includes the south side of Gedney Pass, the head of NE Neets Bay and potentially Neets Creek drainage.

The tributary area contains 3237 acres of harvestable timber, of which 1177 acres are proposed for harvest. This includes the Neets Creek drainage.

Alternatives to reactivation of Shrimp Bay LTF:

No action alternative: No harvest of timber resources in the tributary areas.

Relocate LTF

Connect Shrimp Bay to Klu Bay LTF Site #4

Connect Shrimp Bay area to proposed Neets Bay LTF Site #15a

Sub-alternatives to the proposed LTF reconstruction:

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

Low-angle ramp

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to 3237 acres of timber resources would be foregone.

Relocate LTF: Relocation of the LTF would create new impacts to an undisturbed portion of the aquatic habitat. The upland topography and bathymetry in Neets Bay is very steep making relocation non practicable. No environmental advantages would be gained due to the difficulty of the terrain.

Reactivate existing LTF Site #5: (Preferred alternative) Reactivation of the existing LTF would have the least impact on both the uplands and aquatic ecosystems. Using the single A-Frame method with replacement of the brow and guide rails minimizes the need for expansion of the fill and operating area. Reactivation of the existing LTF will cost \$292,400.

Reactivation and retention of the Shrimp Bay LTF will provide an opportunity to connect the Neets Creek drainage area to Shrimp Bay as the Neets Bay LTF's Sites #15 and #15a are not suitable. (See LTF Sites #15 and #15a evaluations.) Additionally, this connection may provide viable access to a possible electrical power transmission corridor. Construction cost of the road would be approximately \$500,000.

Connect Shrimp Bay to Klu Bay LTF: This would require 2.5 miles of road on excessively steep side slopes. Almost all of the route would be massive rock cuts. This route would impact the Orchard Lake and falls area which is proposed for management as a non roaded area.

This alternative would increase fuel use and haul costs by \$177,000. The additional costs for connecting and using Klu Bay LTF would be \$1,000,000 more than reactivating Shrimp Bay LTF.

A connection to Shrimp Bay would cost over \$1,000,000. The route would disturb about 45 acres of productive land.

From a visual standpoint, high impacts would be expected due to massive full bench cuts and possible mass failures on extremely steep slopes.

Connect Shrimp Bay to proposed Neets Bay LTF Site #15a: Connecting to and transferring logs at Neets Bay LTF Site #15a would require 4.5 miles of road, of which 1.0 mile would be on excessively steep slopes. This alternative would cost about \$1,100,000 for the road and \$415,200 for the LTF, resulting in an additional construction cost of \$515,000. Fuel use and haul costs would increase \$213,000.

Sub-alternatives to the proposed reconstruction of the LTF:

Dry Land Bulkhead to Barge Transfer: Modification of the existing site for barge loading would require extension of the fill and construction of a bulkhead to reach deep water. A 3- to 5-acre sort yard would need to be constructed inland from the site. The operating area would need to be increased in size. The site is surrounded by steep topography, requiring massive rock cuts to expand the site.

The conversion to barge loading and road connection would cost approximately \$1,180,000. Haul and fuel use would be about the same as the proposed action.

Chain Slide System: Due to steep topography and bathymetry, reconfiguration to a chain slide would not be practicable. The existing facility would need to be lowered closer to the extreme tide level to accommodate the chain slide structure. This would require excavating the solid rock site about 8 to 10 feet and expanding the upland area. This option was not considered further.

Low-Angle Ramp: Reconfiguration to a low-angle ramp could not be accommodated due to the upland topography and steep bathymetry to seaward.

Determine if: (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem;

Shrimp Bay #5 is an existing site that has steep bathymetric characteristics with strong tidal currents and depths that will provide good flushing, thereby minimizing impacts to the aquatic ecosystem.

The proposed single A-Frame system is capable of transferring logs at entry velocities of 3ft/sec and less. This capability will minimize discharge of bark into the aquatic ecosystem. Use of the Shrimp Bay LTF and Neets Creek area road connection avoids impacting an extensive high value aquatic ecosystem (tide flat).

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

Determine if: **(iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;**

The existing site was originally a single A-Frame system. Use of the same system type would create the least impact to both the uplands and aquatic ecosystems. The single A-Frame is capable of controlling entry velocities to 3ft/sec and under.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

The reconstruction of the existing site into a single A-Frame and bulkhead with guide rails is preferred to relocation or modification into other systems.

Potentially, the Neets Creek area can be connected to the Shrimp Bay LTF. This would consolidate LTF's and eliminate interference with Southern Southeast Regional Aquaculture Association (SSRAA) hatchery operations. Additionally, The Neets Bay LTF is near an extensive high value aquatic ecosystem, which would be avoided by using and retaining the Shrimp Bay site.

Shrimp Bay LTF serves a small isolated area resulting in short periodic use periods throughout the 100 year rotation. A low-angle ramp would be most economical for such intermittent operations if the site would accommodate the ramp. The next most economical method would be the single A-Frame system. The A-Frame system also provides the least additional impact to both the uplands and the aquatic ecosystem as the site will need minimal expansion of the upland and marine foot print.

HELICOPTER TRANSFER SITES #27, #28, AND #29 (Gedney Pass waterway)

Includes flying logs from the harvest area directly to a barge.
See Attachment C.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

Helicopter transport of logs from the harvest area directly to a barge eliminates need for constructing roads on steep ground.

Several small areas tributary to Gedney Pass are located adjacent to the south and north sides of the Gedney Pass waterway.

The tributary area contains 450 acres of harvestable timber, of which 207 acres are proposed for harvest. This equates to 6 MMBF of timber to be harvested.

Alternatives to the proposed Helicopter Transfer System.

No action alternative: No harvest of timber resources in the tributary areas.

Connect isolated harvest areas to existing Shrimp Bay and Dress Point LTF sites #5 and #3 respectively.

Sub-alternatives to the proposed helicopter to barge transfer:

Flat raft to Shrimp Bay or Klu Bay LTF sites.

Evaluation between alternatives:

No Action: The No-Action alternative would eliminate the need for reactivating the LTF, thus producing no discharge of any pollutants. Accordingly, access to 450 acres of timber resources would be foregone.

Helicopter Transfer: (Preferred Alternative) Helicopter transport directly to a barge will eliminate use of any fill in the aquatic ecosystem.

Connect isolated Gedney Pass areas to Shrimp Bay LTF Site #5 and Dress Point LTF Site #3. Connecting to Shrimp Bay would require 3 miles of road on excessively steep side slopes. The route would cross numerous existing slide areas, have massive rock cuts, and have very steep adverse haul grades making haul practicability marginal.

A connection to Shrimp Bay would cost \$1,200,000 and would disturb about 27 acres of productive land. Numerous mass failures would be expected.

This alternative would increase fuel use and haul costs \$37,000.

The total additional construction costs for connecting to, and using, Shrimp Bay LTF would be about \$1,492,000 more than helicopter transfer.

From a visual standpoint, high impacts would be expected due to massive full bench cuts and mass failures.

Reactivation of Dress Point LTF and road construction and reconstruction would be uneconomical for the small amount of timber resources served by site #5D. An additional 0.25 acre of aquatic habitat would be impacted due to extension of the existing Dress Point steep ramp LTF. Extension would be needed to reach deep water. Reactivation would cost about \$130,000 and road construction and reconstruction would be an additional \$450,000.

Sub-alternatives to the proposed transfer system:

Flat Raft to Shrimp Bay LTF or Klu Bay LTF: Logs would be flown directly to water and placed in a flat raft. The logs would be towed to Shrimp Bay or Klu Bay LTF sites, dewatered, delimbed, sorted, bundled, rewatered, rafted, and towed to manufacturing centers. This would require extensive modification of either of the LTF sites for moving logs from the flat raft to the uplands for sorting. Due to the need for extensive modification of the LTF sites and limited potential for development of a sort yard, this alternative was not considered further.

Determine if: (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem;

Helicopter transfer of logs from the harvest area directly to a barge minimizes impacting the shallow high value marine habitat near the shoreline. The need for fill in the aquatic ecosystem is eliminated by using this system.

Landing logs on a barge will eliminate discharge of bark into the aquatic ecosystem. Periodic cleaning of the barge deck would minimize surface runoff into the aquatic ecosystem.

Determine if: (iii) **The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;**

The Helicopter transfer system will create the least impact to both the uplands and aquatic ecosystems. The need for filling in aquatic habitat and surface runoff control is eliminated by use of this system.

The use of helicopter transfer for the isolated Gedney Pass harvest area is preferable to developing a land LTF or connecting to other LTF sites as it will minimize both upland and aquatic ecosystem impacts and costs. Development of roads and the LTF would be uneconomical for the amount of timber volume being harvested at this area.

Surface runoff into the aquatic ecosystem will be kept to a minimum by periodically cleaning the barge deck of bark and woody debris.

PROPOSED CHIN POINT LTF Site #7

Includes construction of a low-angle ramp consolidating two non-viable existing LTF sites. See Attachment C.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

The Chin Point LTF is a proposed low-angle 10 percent ramp that consolidates two existing LTF's. The two existing sites do not meet Alaska Timber Task Force siting guidelines.

The area tributary to the Chin Point LTF includes a small area adjacent to N.W Neets Bay.

The tributary area contains 1394 acres of harvestable timber, of which 572 acres are proposed for harvest.

Alternatives to the proposed Chin Point LTF:

No action alternative: No harvest of timber resources in the tributary areas.

Reactivate Chin Point Site #6.

Reactivate NW Neets LTF Site #8

Relocate to proposed NW Neets Site #9

Connect NW Neets Bay area to existing Shrimp Bay LTF Site #5

Connect NW Neets Bay to Neets Bay LTF Sites #15 or #15a

Sub-alternatives to the proposed LTF:

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

A-Frame lift-off system with fill and bulkhead.

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to 1394 acres of timber resources would be foregone.

Reactivate Chin Point Site #6: The existing site is directly adjacent to a cataloged fish stream. Thus, reactivation would not meet Alaska Timber Task Force Siting Guidelines.

Reactivate NW Neets Site #8: The bathymetry of the NW Neets site would require an extremely large fill to reach deep water. Approximately 0.5 acres of aquatic habitat would be covered with fill. The site would cost about \$415,000. This site is shallow which does not meet the Alaska Timber Task Force Siting Guidelines.

Relocate LTF to NW Neets Site #9: The NW Neets site would create new impacts to an undisturbed portion of the aquatic habitat. The bathymetry at this site is shallow and would not meet Alaska Timber Task Force guidelines. The characteristics of this site are similar to site #8.

Construct Chin Point Low-angle Ramp LTF Site #7: (Preferred Alternative) The topographical and bathymetric characteristics are most favorable for a 10 percent sloped ramp. This will create the least amount of fill in the aquatic ecosystem, provide control of entry to velocities at or below 3ft/sec, and minimize upland disturbance. Approximately 0.15 acres fill will be in the aquatic ecosystem.

Connect Chin Point to Shrimp Bay LTF: This would require 5.0 miles of road on excessively steep side slopes. Almost all of the route would be massive rock cuts.

A connection to Shrimp Bay would cost over \$2,000,000. The route would disturb about 45 acres of productive land. Numerous mass failures would be expected if this route was used.

This alternative would increase fuel use and haul costs by \$349,000. The additional cost for connecting to, and using, Shrimp Bay LTF would be \$2,128,000 more than using Chin Point LTF Site #7.

From a visual standpoint, high impacts would be expected due to massive full bench cuts and possible mass failures on extremely steep slopes.

Connect Chin Point Site #7 to existing Neets Bay LTF Sites #15 or #15a: This alternative would require 7.0 to 8.5 miles of road, 6.0 miles of which would be on excessively steep slopes. This alternative was not considered further due to costs, mass failure risks, visual impacts and unlikely use of sites #15 and #15a. Only the LTF Site #15 to Shrimp Bay connection is viable. (See LTF Site #15 and #15a evaluations.)

Sub-alternatives to the proposed reconstruction of the LTF:

Dry Land Bulkhead to Barge Transfer: One characteristics of the NW Neets-Chin point beach area is that it is shallow to a distance of 200 feet and greater. Site #7 is more bathymetrically suited for a ramp type LTF configuration rather than another type system needing deep water near the shoreline to reduce fill.

Barge loading would require an extensive fill to reach adequate water depths. The operating area would need to be increased in size. A 3- to 5-acre sort yard would be needed adjacent to the operating area. The fill would cover about 0.5 acres of aquatic habitat.

The barge loading and sort yard option would cost approximately \$930,000. Haul and fuel use would be about the same as the proposed action.

Chain Slide System: Due to the shallow bathymetry, a chain slide would require a large fill to reach adequate water depths. Construction costs would be \$316,000. Haul costs would be about the same as the proposed action. Approximately 0.3 acres of the aquatic habitat will be covered by fill material and slide structure.

A-Frame System: An extremely large fill would be needed to reach adequate water depths as the bathymetry is not suitable for this system. Approximately 0.5 acres of aquatic ecosystem would be effected. The site would cost about \$390,000.

Determine if: (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem;

Chin Point #7 best meets the Alaska Timber Task Force Siting Guidelines. The site creates the least impact on the uplands and aquatic ecosystem.

This site was investigated and recommended for use by the National Marine Fisheries Service and U.S. Fish and Wildlife Service.

The proposed low-angle ramp system is capable of transferring logs at entry velocities of 3ft/sec and less. This capability will minimize discharge of bark into the aquatic ecosystem.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

Determine if: The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;

The low-angle system will create the least impact to both the uplands and aquatic ecosystems. The low-angle ramp is capable of controlling entry velocities to 3ft/sec and under.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

The construction of the low-angle system is preferred to reactivating existing sites or modifying into other systems as it will minimize impacts and costs, and it will best meet siting guidelines.

HELICOPTER TRANSFER SITE #25 (Near Clam Island LTF Site #10)

Includes flying logs from the harvest area directly to a barge.
See Attachment C.

Evaluation of Alternatives:

Determine if: (i) **There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;**

Description:

Helicopter transport of logs from the harvest area directly to a barge eliminates need for constructing roads on steep ground.

The area tributary to Clam Island LTF Site #10 includes a small area adjacent to the north central Neets Bay.

The tributary area contains 100 acres of harvestable timber, of which 40 acres are proposed for harvest. This equates to 6 MMBF of timber to be harvested.

Alternatives to the proposed Helicopter Transfer System:

No action alternative: No harvest of timber resources in the tributary areas.

Reactivate and modify existing Clam Island LTF Site #10

Connect Clam Island LTF Site #10 to Same Cove LTF Site #11¹

Connect Clam Island LTF Site #10 to Shrimp Bay LTF Site #5²

Connect Clam Island LTF Site #10 to Chin Point LTF Site #7

Sub-alternatives to the proposed helicopter to barge transfer:

Flat raft to Fire Cove LTF Site #16 or Chin Point LTF Site #7

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

A-Frame lift-off system with fill and bulkhead.

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No-Action alternative would eliminate the need for reactivating the LTF, thus producing no discharge of any pollutants. Accordingly, access to 450 acres of timber resources would be foregone.

Helicopter Transfer: (Preferred Alternative) Helicopter transport directly to a barge will eliminate use of any fill in the aquatic ecosystem.

Reactivate and modify Clam Island LTF Site #10: The existing site was built as a steep slide. The site topography and bathymetry would accommodate a low-angle ramp with minimum disturbance to both the uplands and aquatic ecosystems. Only 1.3 MMBF will be harvested in the area making reactivation uneconomic. An additional 0.3 acre of aquatic habitat would be impacted due to extension of the steep slide to a 10 percent ramp. Reactivation would cost about \$122,600.

Connect Clam Island LTF Site #10 to Same Cove LTF Site #11: This would require 1.5 miles of road on excessively steep side slopes. The route would have massive rock cuts and very steep adverse haul grades making haul practicability marginal.

A connection to Same Cove would cost \$375,000. The route would disturb about 14 acres of productive land.

A connection to Same Cove would increase fuel and haul costs by \$72,000.

The total additional construction cost for connecting to, and using, Same Cove LTF Site #11 would be \$557,000 more than reactivating Clam Island LTF.

From a visual standpoint, high impacts would be expected due to massive full bench cuts.

Connect Connect Clam Island LTF Site #10 to Shrimp Bay LTF Site #5: This would require 3.5 miles of road on excessively steep side slopes. The route would cross numerous existing slide areas, have massive rock cuts and very steep adverse haul grades making haul practicability marginal.

A connection to Shrimp Bay would cost \$1,175,000 and would disturb 32 acres of productive land. Numerous mass failures would be expected.

This alternative would increase fuel use and haul costs \$22,000.

The total additional construction costs for connecting to, and using, Shrimp Bay LTF would be \$1,345,000 more than using Clam Island LTF Site #10.

From a visual standpoint, high impacts would be expected due to massive full bench cuts and mass failures.

Connect Clam Island LTF Site #10 to Chin Point LTF Site #7: This alternative would require 2.5 of road, 1.5 miles of which would be on excessively steep slopes and cross a major stream requiring a large bridge.

The major stream lies in a deep trench with near vertical side walls of 70 to 100 feet. There are no reasonable crossing sites that would allow use of a practicable haul grade. Rock excavation would be massive due to terrain. This option was not considered further due to the severity of the stream crossing, Grade practicability, road costs and the small amount of timber volume being served.

Sub-alternatives to the proposed transfer system:

Flat Raft to Fire Cove or Chin Point LTF Site: Logs would be flown directly to a water and placed in a flat raft. The logs would be towed to either Fire Cove or Chin Point LTF site, dewatered, delimbed, sorted, bundled, rewatered, rafted, and towed to manufacturing centers. This would require extensive modification of either of the LTF sites for moving logs from the flat raft to the uplands for sorting. Due to the need for extensive modification of the LTF sites and limited potential for development of a sort yard, this alternative was not considered further.

Dry Land Bulkhead to Barge Transfer: The characteristics of the Clam Island LTF beach area is shallow to seaward for 200 feet. Site #10 is more bathymetrically suited for a ramp type LTF configuration rather than another type system needing deep water near the shoreline to reduce fill.

Barge loading would require an extensive fill to reach adequate water depths. The operating area would need to be increased in size. A 3- to 5-acre sort yard would be needed adjacent to the operating area. The fill would cover about 0.5 acre of aquatic habitat. The site is in a small bight that make barge navigation hazardous.

The barge loading and sort yard option would cost approximately \$930,000. Haul and fuel use would be about the same as the proposed action.

Chain Slide System: Due to the shallow bathymetry, a chain slide would require a large fill to reach adequate water depths. Construction costs would be \$373,000. Haul costs would be about the same as the proposed action. Approximately 0.35 acres of the aquatic habitat will be covered by fill material and slide structure.

A-Frame System: An extremely large fill would be needed to reach adequate water depths as the bathymetry is not suitable for this system. Approximately 0.5 acres of aquatic ecosystem would be effected. The site would cost about \$390,000.

Determine if: (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem;

Helicopter transfer of logs from the harvest area directly to a barge minimizes impact on the shallow high value marine habitat near the shoreline. The need for fill in the aquatic ecosystem is eliminated by using this system.

Landing logs on a barge will eliminate discharge of bark into the aquatic ecosystem. Periodic cleaning of the barge deck would minimize surface runoff into the aquatic ecosystem.

Determine if: (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;

The Helicopter transfer system will create the least impact to both the uplands and aquatic ecosystems. The need for filling in aquatic habitat and surface runoff control is eliminated by use of this system.

The use of helicopter transfer for the Clam Island LTF Site #10 harvest area is preferable to developing a land LTF or connecting to other LTF sites as it will minimize both upland and aquatic ecosystem impacts and costs. Development of roads and the LTF would be uneconomical for the amount of timber volume being harvested at this area.

Surface runoff into the aquatic ecosystem will be kept to a minimum by periodically cleaning the barge deck of bark and woody debris.

HELICOPTER TRANSFER SITE #26 (Near Same Cove LTF Site #11)

Includes flying logs from the harvest area directly to a barge.
See Attachment C.

Evaluation of Alternatives:

Determine if: (i) **There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;**

Description:

Helicopter transport of logs from the harvest area directly to a barge eliminates need for reactivating the existing LTF.

Same Cove LTF was originally a steep slide system.

The area tributary to the Same Cove LTF includes a very small area adjacent to N. Neets Bay.

The tributary area contains 100 acres of harvestable timber, of which 45 acres are proposed for harvest. This equates to approximately 1.4 MMBF of timber volume to be harvested.

Alternatives to the proposed Helicopter Transfer System:

No action alternative: No harvest of timber resources in the tributary areas.

Reactivate and modify existing Same Cove LTF Site #11

Connect Same Cove LTF Site #11 to Clam Island LTF Site #10

Connect Same Cove LTF Site #11 to Shrimp Bay LTF Site #5

Connect Same Cove LTF Site #11 to Chin Point LTF Site #7¹

Sub-alternatives to the proposed LTF:

Flat raft to Fire Cove LTF Site #16 or Chin Point LTF Site #7

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

A-Frame lift-off with fill and bulkhead.

Other alternatives not demonstrated as practicable were not considered further, for example, pile₄ supported bridge ramp and barge or special slide out ramps etc.

Evaluation between alternatives:

No Action: The No-Action alternative would eliminate the need for reactivating the LTF, thus producing no discharge of any pollutants. Accordingly, access to 100 acres of timber resources would be foregone.

Helicopter Transfer: (Preferred Alternative) Helicopter transport directly to water will eliminate use of any fill in the aquatic ecosystem. Logs will be placed and rafted in deep water off shore of LTF Site #11.

Reactivate and Modify Same Cove LTF Site #11: The existing site was originally a steep slide. The site topography and bathymetry would accommodate a single A-Frame system. Only 1.4 MMBF will be harvested in the area making reactivation uneconomic. An additional 0.25 acres of aquatic habitat would be impacted due to extension of the fill and bulkhead replacement needed to reach deep water. Reactivation would cost about \$304,600.

Connect Same Cove LTF Site #11 to Clam Island LTF Site #10: This would require 1.5 miles of road on excessively steep side slopes. The route would have massive rock cuts and very steep adverse haul grades making haul practicability marginal.

A connection to Clam Island LTF would cost \$375,000. The route would disturb about 14 acres of productive land.

This alternative would increase fuel use and haul costs by \$6,700.

The total additional construction costs for connecting to, and using, Clam Island LTF would be \$193,000 more than using Same Cove LTF Site #11.

From a visual standpoint, high impacts would be expected due to massive full bench cuts.

Connect Same Cove LTF Site #11 to Shrimp Bay LTF Site #5: This would require 2.0 miles of road on excessively steep side slopes. The route would cross numerous existing slide areas and would have massive rock cuts and very steep adverse haul grades making haul practicability marginal.

A connection to Shrimp Bay would cost \$800,000 and would disturb about 20 acres of productive land. Numerous mass failures would be expected.

This alternative would increase fuel use and haul costs \$18,000.

The total additional construction cost for connecting to, and using, Shrimp Bay LTF would be about \$788,000 more than helicopter transfer.

From a visual standpoint, high impacts would be expected due to massive full bench cuts and mass failures.

Connect Same Cove LTF Site #11 to Chin Point LTF Site #7: This alternative would require 3.5 miles of road, 2.0 miles of which would be on excessively steep slopes and cross a major stream requiring a large bridge.

The major stream lies in a deep trench with vertical rock side walls of 70 to 100 feet. There are no reasonable crossing sites that would allow use of a practicable haul grade. Rock excavation would be massive due to terrain. This site was not considered further due to the severity of the stream crossing and grade practicability.

Sub-alternatives to the proposed reconstruction of the LTF:

Flat Raft to Fire Cove or Chin Point LTF Site: Logs would be flown directly to water and placed in a flat raft. The logs would be towed to either Fire Cove or Chin Point LTF site, dewatered, delimbed, sorted, bundled, rewatered, rafted, and towed to manufacturing centers. This would require extensive modification of either of the LTF sites for moving logs from the flat raft to the uplands for sorting. Due to the need for extensive modification of the LTF sites and limited potential for development of a sort yard, this alternative was not considered further.

Dry Land Bulkhead to Barge Transfer: Same Cove is very small with a very narrow entrance. A large rock lies in the center of the entrance that would be a high risk hazard to navigation by large vessels. Thus, a barge loading system at the existing site would not be practicable.

Chain Slide System: The site could be modified for use of a chain slide. Part of the existing fill would need to be removed, the operating area would need to be expanded to replace the removed fill area. Conversion to a chain slide would cost about \$392,000. Approximately 0.25 acres of the aquatic habitat would be covered by fill material and slide structure.

Low-angle Ramp: The topographical and bathymetrical characteristics of the Same Cove LTF site would not accommodate a low-angle ramp LTF.

Determine if: (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem;;

Helicopter transfer of logs from the harvest area directly to a barge minimizes impact on the shallow high value marine habitat near the shoreline. The need for fill in the aquatic ecosystem is eliminated by using this system.

Landing logs on a barge will eliminate discharge of bark into the aquatic ecosystem. Periodic cleaning of the barge deck would minimize surface runoff into the aquatic ecosystem.

Determine if: (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;

The Helicopter transfer system will create the least impact on both the uplands and aquatic ecosystems. The need for filling in aquatic habitat and surface runoff control is eliminated by use of this system.

The use of helicopter transfer for the Same Cove LTF Site #11 harvest area is preferable to developing a land LTF or connecting to other LTF sites as it will minimize both upland and aquatic ecosystem impacts and costs. Development of roads and the LTF would be uneconomical for the amount of timber volume being harvested at this area.

Surface runoff into the aquatic ecosystem will be kept to a minimum by periodically cleaning the barge deck of bark and woody debris.

CONNECT NEETS BAY LTF Site #15 TO SHRIMP BAY LTF Site #5

Includes reactivation of Shrimp Bay LTF Site #5 and connection of the head of Neets Bay and Neets Creek drainage to the Shrimp Bay LTF. See Reactivation of Shrimp Bay LTF discussions presented previously. See Attachment C.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

The Neets Bay LTF is an existing facility originally constructed as a steep slide. The site does not meet Alaska Timber Task Force Siting Guidelines.

The area tributary to the Neets Bay LTF includes the head of Neets Bay and the Neets Creek Drainage.

The tributary area contains 1175 acres of harvestable timber, of which 588 acres are proposed for harvest.

Alternatives to the connection of Neets Bay LTF Site #15 to Shrimp Bay #5:

No action alternative: No harvest of timber resources in the tributary areas.

Relocate LTF to Neets Bay LTF Site #15a

Reactivate and modify Neets Bay LTF Site #15

Connect Neets Bay LTF Site #15 to Shrimp Bay LTF Site #5

Connect Neets Bay LTF Site #15 to Fire Cove LTF Site #16

Sub-alternatives to the proposed LTF reconstruction:

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

Low-angle ramp

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to 1177 acres of timber resources would be foregone.

Relocate LTF: Relocation of the LTF to site #15a would create new impacts to an undisturbed portion of the aquatic habitat and uplands. Relocation would require approximately 1.5 miles of additional road, of which 1.0 mile is on excessively steep slopes.

The additional road needed to access site 15a would cost \$500,000 and create massive cuts and visual impacts. Some mass failures may be expected on the excessively steep slopes. Using site #15a would increase construction costs \$372,000 more than by using site #15, if site #15 could be permitted.

Use of site #15a would not aid in providing access to the power transmission corridor in the area.

The fuel use and haul cost would be about \$47,000 more than using the existing Neets Bay LTF.

Reactivate existing Neets Bay LTF Site #15: Reactivation of the existing LTF would require relocation of several fish rearing pens, expansion of the fill to reach deep water, and installation of a bulkhead and an A-Frame system. The fish rearing pens are operated by the SSRAA Neets Bay Fish Hatchery.

This site is located adjacent to an extensive tidal flat, which is a high value aquatic habitat area. The Neets Bay LTF Site #15 would be unsuitable due to proximity of the SSRAA Neets Bay Hatchery operations and high value aquatic habitat. Log transferring and rafting would interfere with SSRAA hatchery operations.

The N. Revilla DEIS proposes connecting the Neets Creek area to LTF Site #5 to avoid reactivating Neets Bay LTF Site #15. See "Connect Neets Bay LTF Site #15 to Shrimp Bay LTF Site #5" for further evaluation concerning this LTF.

Connect Neets Bay LTF Site #15 to Shrimp Bay LTF Site #5: (Preferred Alternative) This alternative would require 2.5 miles of road on moderate to steep slopes and reactivation of the Shrimp Bay LTF. Connection of this link is proposed because the Neets Bay LTF Site #15 and #15a are not suitable. (See LTF Site 15a evaluation.)

A feasibility study, "Lake Tyee to Swan Lake Transmission Intertie", by R.W. Beck and Assoc., 1992, has indicated a preferred power line corridor for the Swan Lake and Tyee Lake intertie along a route between Neets Bay LTF Site #15 to Shrimp Bay LTF Site #5. This is largely due to the existence of some forest roads in the area that will reduce power line construction and maintenance access costs.

Connection of the Neets Creek drainage to the existing Shrimp Bay LTF Site #5 would avoid discharge near high value aquatic habitat and avoid relocation of fish rearing pens. This connection would provide opportunity to serve both forest and possible power line access, and it would consolidate LTF's.

This alternative will increase fuel use and haul costs by \$119,000. Because site #15 is not suitable, only site #15a or connecting to Shrimp Bay #5 are viable. The additional construction cost of connecting to, and using, Shrimp Bay LTF would be \$281,000 more than using Neets Bay LTF Site # 15 if it could be permitted.

Connect Neets Bay LTF Site #15 to Fire Cove LTF Site #16: Connecting Neets Bay LTF Site #15 to Fire Cove would require 3 miles of road on very broken and steep ground. Excessively large cuts would be needed to allow construction of a practicable grade.

Construction of this route would in excess of \$1,200,000. Fuel use and haul costs would increase \$245,000. This option would cost \$700,000 more than connecting to Shrimp Bay LTF Site #5. The route would disturb 28 acres of productive land.

The large cuts would create high visual impacts. Some mass failures would be expected.

Sub-alternatives to the proposed reconstruction of the LTF:

Because of the proximity of the SSRAA Neets Bay fish hatchery and extensive tidal flat area, no further consideration was given to reactivating Neets Bay LTF Site #15. Connecting Neets Creek area to Shrimp Bay rather than using site #15a would save about \$30,000. However, the additional haul cost for using Shrimp Bay would be \$72,000 more than using site #15a.

Determine if: (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem;

Shrimp Bay #5 is an existing site that has steep bathymetric characteristics with strong tidal currents and depths that will provide good flushing, minimizing impacts to the aquatic ecosystem.

Avoiding the use of Neets Bay LTF Site #15 avoids degrading extensive tidal flats at the head of Neets Bay. Additionally, avoiding use of Neets Bay LTF negates the need for relocating the SSRAA Neets Bay Fish Hatchery fish rearing pens.

The proposed single A-Frame system is capable of transferring logs at entry velocities of 3ft/sec and less. This capability will minimize discharge of bark into the aquatic ecosystem.

Surface runoff into the aquatic ecosystem would be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25.)

Determine if: (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;

The existing Shrimp Bay LTF Site #5 site was originally a single A-Frame system. Use of the same system type will create the least impact to both the uplands and aquatic ecosystems. The single A-Frame is capable of controlling entry velocities to 3ft/sec and under.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

The N. Revilla DEIS proposes to use the Shrimp Bay site and connect the Neets Creek area to the Shrimp Bay LTF. This will consolidate LTF's and eliminate interference with SSRAA hatchery operations. Additionally, Neets Bay LTF Site #15 is near an extensive high value aquatic ecosystem, which would be avoided by using Shrimp Bay LTF Site #5.

Shrimp Bay LTF serves a small isolated area resulting in short periodic use periods throughout the 100 year rotation. A low-angle ramp would be most economical for such intermittent operations if the site would accommodate the ramp. The next most economical method is the single A-Frame system. The A-Frame also provides the least additional impacts to both the uplands and the aquatic ecosystem.

REACTIVATION OF FIRE COVE LTF Site #16

Includes reconstruction of the existing LTF. Reactivation would be accomplished by replacing the single A-Frame lift-off system, bulkhead and guide rails. See Attachment C.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

The Fire Cove LTF Site #16 is an existing facility requiring reactivation or relocation.

The area tributary to the Fire Cove LTF includes the south side of central Neets Bay and the Traitors Creek Drainage.

The tributary area contains 4884 acres of harvestable timber, of which 2127 acres are proposed for harvest.

Alternatives to reactivation of Fire Cove LTF:

No action alternative: No harvest of timber resources in the tributary areas.

Relocate LTF

Connect Fire Cove LTF Site #16 to existing Margaret Bay LTF Site #24³

Connect Fire Cove LTF Site #16 to existing Shrimp Bay LTF Site #5¹

Connect Fire Cove LTF Site #16 to proposed N. Traitors LTF Site #22²

Sub-alternatives to the proposed LTF reconstruction:

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

Low-angle ramp

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to 4884 acres of timber resources would be foregone.

Relocate LTF: Relocation of the LTF would create new impacts to an undisturbed portion of the aquatic habitat. The upland topography and bathymetry in Neets Bay is very steep making relocation non-practicable. No environmental advantages would be gained due to the difficulty of the terrain.

Reactivate existing Fire Cove LTF Site #16: (Preferred Alternative) Reactivation of the existing LTF will require the least impact on both the uplands and aquatic ecosystems. Using the single A-Frame method with replacement of the brow and guide rails minimizes changes in the foot print in the aquatic and upland ecosystems.

Reactivation of the Fire Cove LTF would cost \$292,400. The existing LTF lies within forested wetland. No expansion is expected, however, removal and replacement of guy line deadman anchors outside of the foot print is necessary.

Reactivate Fire Cove LTF Site #16 and connect to Margaret Bay LTF Site #24: This option would reactivate both Fire Cove and Margaret Bay LTF sites and connect them by road. The connection to Margaret Bay would require 1.5 miles of road on some excessively steep side slopes. Some of the route would have large rock cuts.

Connecting Traitors Creek area to Margaret Bay LTF Site #24 would be for administrative purposes. This would not alleviate the need for both the Fire Cove and Margaret Bay facilities, as several operators will be using both sites concurrently within the 5 year planning period.

A connection from Traitors Creek to Margaret Bay would cost about \$525,000. The route would disturb approximately 14 acres of productive land.

From a safety stand point, the road connection would eliminate small boat travel from Traitors Cove or Ketchikan to Neets Bay via Behm Canal. Small boat travel in Behm Canal is subject to weather conditions. To minimize boat travel, crew quarters would be needed at Fire Cove unless a road connection is made. If the road connection is made, the Fire Cove and Traitors Creek areas could be managed from the USFS 16 person work center adjacent to the Margaret Bay LTF. The connection is dependent upon availability of funding.

Fuel use and haul would not change as the timber volume tributary to each of the LTF sites would be hauled to the applicable site. Haul costs would only increase if one site was not reactivated which is unlikely. If all timber was hauled to Margaret Bay, the haul would increase \$1,650,000. If all timber was hauled to Fire Cove the cost would increase \$1,807,000,

From a visual standpoint, some large cuts would be visible from Traitor Cove.

Connect Fire Cove LTF Site #16 to Shrimp Bay LTF Site #5: Connecting Fire Cove LTF Site #16 to Shrimp Bay LTF Site #5 would require 3 miles of road on very broken and steep ground between Neets Bay LTF Site #15 and Fire Cove and 2.5 miles between Neets Bay LTF Site #15 and Shrimp Bay. The Neets Bay to Shrimp Bay segment is practicable, however, the Fire Cove to Neets Bay segment would have excessively large cuts to allow construction of a practicable grade.

Construction of the Fire Cove to Neets Bay segment would be in excess of \$1,200,000, and the Neets Bay to Shrimp Bay portion would be \$500,000. Correspondingly, these routes would disturb 28 and 23 acres of productive land. Accumulatively, these would cost \$1,700,000 and disturb 51 acres.

Fuel use and haul costs would increase \$1,290,000.

Visual impacts would be high on the Fire Cove to Neets Bay segment. The Neets Bay segment would create less visual impacts as the terrain is not as difficult.

Connect Fire Cove LTF Site #16 to proposed N. Traitors LTF Site #22: Connecting the Fire Cove area to the N. Traitors LTF Site #22 area would require 1 mile of road. The route lies on very steep slopes with high risk of mass movement. This alternative would cost about \$400,000. Visual impacts would be high. The route would create 9 acres of disturbance to productive land. The additional construction costs of connecting to, and using, N. Traitors LTF Site #22 would be \$491,000 more than using Fire Cove LTF Site #16.

Fuel and haul costs would increase \$635,000 over transferring logs at Fire Cove.

Sub-alternatives to the proposed reconstruction of the LTF:

Dry Land Bulkhead to Barge Transfer: Modification of the existing site for barge loading would require extension of the fill and construction of a bulkhead to reach deep water. A 3- to 5-acre sort yard would need to be constructed inland from the site. The operating area would need to be increased in size. The site is surrounded by steep topography, requiring massive rock cuts to expand the site. The existing Fire Cove small boat/plane float would require relocation.

The conversion to barge loading, sort yard, and float relocation would cost approximately \$960,000. Haul and fuel use would be about the same as the proposed action.

The sort yard would create 3- to 5-acres of additional impacts to forested wetlands. The existing permanent small boat dock would need to be relocated.

Chain Slide System: Due to steep topography and bathymetry, re-configuration to a chain slide would require removal of much of the existing fill and expansion of the upland operating area due to loss of the fill area. Expansion of the upland operating area would impact an additional 0.25 acres of forested wetland. Construction costs would be about \$27,000. Haul costs would be about the same as the proposed action.

Low-Angle Ramp: Modification to a low-angle ramp could not be accommodated due to the upland topography and steep bathymetry to seaward.

Determine if: (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem;

Fire Cove LTF Site #16 is an existing site that has steep bathymetric characteristics with strong tidal currents and depths that will provide good flushing, minimizing impacts to the aquatic ecosystem.

The proposed single A-Frame system is capable of transferring logs at entry velocities of 3ft/sec and less. This capability will minimize discharge of bark into the aquatic ecosystem.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

Determine if: (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;

The existing site was originally a single A-Frame system. Use of the same system type would create the least impact to both the uplands and aquatic ecosystems. The single A-Frame is capable of controlling entry velocities to 3ft/sec and under.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

The reconstruction of the existing single A-Frame and bulkhead with guide rails is preferred to relocation, connecting to other areas, or modifying into other systems. This option requires the minimum change in the existing foot print.

REACTIVATION OF SW NEETS BAY LTF Site #17

Includes reconstruction of the existing LTF. Reactivation would be accomplished by replacing the A-Frame lift-off system, and guide rails. See Attachment C.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

The SW Neets Bay LTF Site #17 is an existing facility requiring reactivation or relocation.

The area tributary to the SW Neets Bay LTF includes the south western portion of Neets Bay.

The tributary area contains 612 acres of harvestable timber, of which 136 acres are proposed for harvest.

Alternatives to reactivation of SW Neets Bay LTF:

No action alternative: No harvest of timber resources in the tributary areas.

Relocate LTF

Connect SW Neets Bay LTF Site #17 to existing Fire Cove LTF Site #16²

Connect SW Neets Bay LTF Site #17 to proposed NW Traitors LTF Site #18³

Connect SW Neets Bay LTF Site #17 to proposed N. Traitors LTF Site #22³

Sub-alternatives to the proposed LTF reconstruction:

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

Low-angle ramp

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to 612 acres of timber resources would be foregone.

Relocate LTF: Relocation of the LTF would create new impacts to an undisturbed portion of the aquatic habitat. The upland topography and bathymetry in Neets Bay is very steep making relocation non-practicable. No environmental advantages would be gained due to the difficulty of the terrain.

Reactivate existing SW Neets Bay LTF Site #17: (Preferred Alternative) Reactivation of the existing LTF will require the least impact on both the uplands and aquatic ecosystems. Using an A-Frame method with replacement of the brow and guide rails minimizes changes in the foot print in the aquatic and upland ecosystems.

Reactivation of the SW Neets Bay LTF would cost \$272,000. No change in the existing foot print is expected.

Connect SW Neets Bay LTF Site #17 to Fire Cove LTF Site #16: Connecting SW Neets Bay to Fire Cove would require 4.5 miles of road on numerous excessively steep side slopes. Much of the route would have large rock cuts.

The road connection would cost approximately \$1,575,000. The route would disturb approximately 41 acres of productive land.

This alternative would increase fuel use and haul costs by \$61,000. The total additional construction cost for connecting to, and using, Fire Cove LTF would be \$1,617,000 more than reactivating SW Neets Bay LTF.

From a visual standpoint, numerous large cuts would be visible from Traitors Cove. Road construction on several excessively steep areas would create a high risk of mass movement.

Connect SW Neets LTF Site #17 to NW Traitors LTF Site #18: Connecting these areas would require about 0.7 mile of road. The connection would have favorable haul grades toward NW Traitors LTF. Existing roads will have steep adverse grades that would require tractor assist or restricted load sizes. The route would be on some excessively steep slopes.

Construction of a SW Neets Bay LTF to NW Traitors LTF connection would cost about \$200,000. Approximately 6 acres of productive land would be disturbed.

Fuel use and haul costs would increase \$36,000.

The total construction cost of connecting and using NW Traitors would be \$254,000 more than using SW Neets Bay LTF.

Visual impacts would be high on the SW Neets Bay to NW Traitors connection because of the steep slopes and angle of view from Behm Canal.

Connect SW Neets Bay LTF Site #17 to proposed N. Traitors LTF Site #22: Connecting these areas would require about 0.8 mile of road on extremely steep slopes. Connection of these areas would have a very steep grade requiring tractor assist or restricted load sizes. Visual impacts would be high. The route would disturb 7.0 acres of productive land. The connection would cost \$195,000.

Fuel and haul costs would increase \$51,000.

The total construction cost of connecting and using N. Traitors LTF would be \$306,000 more than using SW Neets Bay LTF.

Sub-alternatives to the proposed reconstruction of the LTF:

Dry Land Bulkhead to Barge Transfer: Modification of the existing site for barge loading would require extension of the fill and construction of a bulkhead to reach deep water. A 3- to 5-acre sort yard would need to be constructed inland from the site. The operating area would need to be increased in size. The site is surrounded by steep topography, requiring massive rock cuts to expand the site.

The conversion to barge loading and sort yard would cost approximately \$1,000,000. Haul and fuel use would be about the same as the proposed action.

Chain Slide System: Due to steep topography and bathymetry, modification to a chain slide would require removal of the existing fill and expansion of the upland operating area due to loss of the fill area. Expansion of the upland operating area would impact an additional 0.3 acres of land. Construction costs would be about \$459,000. Fuel and haul costs would be about the same as the proposed action.

Low-Angle Ramp: Modification to a low-angle ramp could not be accommodated due to the upland topography and steep bathymetry to seaward.

Determine if: **(ii) The proposed discharge will result in significant degradation of the aquatic ecosystem;;**

SW Neets Bay LTF Site #17 is an existing site that has steep bathymetric characteristics with strong tidal currents and depths that will provide good flushing, minimizing impacts to the aquatic ecosystem.

The proposed A-Frame system is capable of transferring logs at entry velocities of 3ft/sec and less. This capability will minimize discharge of bark into the aquatic ecosystem.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

Determine if: **(iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;**

The existing site was originally an A-Frame system. Use of the same system type will create the least impact to both the uplands and aquatic ecosystems. The A-Frame is capable of controlling entry velocities to 3ft/sec and under.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

The minor reconstruction of the existing A-Frame and bulkhead with guide rails is preferred to relocation, connecting to other areas, or modification into other systems.

CONNECT NW TRAITORS LTF Site #18 TO SW NEETS BAY LTF Site #17

Includes consolidation of LTF sites by connecting the NW Traitors tributary area to the SW Neets Bay LTF Site #17. See Attachment D.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

The NW Traitors LTF Site #18 is a proposed facility requiring construction of a low-angle ramp or connection to the existing SW Neets Bay LTF Site #17.

The area tributary to the NW Traitors LTF includes the north western portion of Neets Bay between Bushy Point Cove and Virgin Bay.

The tributary area contains 459 acres of harvestable timber, of which 230 acres are proposed for harvest.

Alternatives to connecting NW Traitors LTF Site #18 to SW Neets Bay LTF Site #17:

No action alternative: No harvest of timber resources in the tributary areas.

Relocate LTF

Construct NW Traitors LTF Site #18

Connect NW Traitors LTF Site #18 to proposed N. Traitors LTF Site #22¹

Sub-alternatives to the proposed LTF construction:

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

A-Frame System

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to 459 acres of timber resources would be foregone.

Relocate LTF: Other sites such as #19, #20 and #21 were investigated, however, the bathymetric characteristics were unsuitable. These sites require additional road development in a State land selection. No environmental or monetary advantages would be gained by relocating to another site.

Construct Proposed NW Traitors LTF Site #18: Construction of a low-angle ramp LTF will require constructing approximately 1.0 mile of road and an LTF on State selected land. The rock fill will cover about 0.25 acres of aquatic habitat and about 0.4 acre of productive uplands. The bathymetric and topographical characteristics of the site are favorable for a low-angle ramp.

Construction of the NW Traitors LTF and roads on a state land selection would cost \$326,000.

Connect NW Traitors LTF Site #18 to SW Neets Bay LTF Site #17: (Preferred Alternative) Connecting these areas would require about 0.7 mile of road. The connection would have steep adverse grades requiring restricted load sizes and higher than normal haul costs.

The road connection would cost approximately \$200,000. The route would disturb approximately 6 acres of productive land.

This alternative would increase fuel use and haul costs by \$107,000. The total additional construction cost for connecting to, and using,, SW Neets Bay LTF would be \$146,000 more than using NW Traitors LTF Site #18.

Visual impacts would be moderate as the connecting route lies in a valley bottom that is partially screened from view points on Traitors Cove and Behm Canal. The route is on moderate slopes that minimizes large visible cut slopes. This connection would avoid the need of road and LTF easements on State selected land.

Connect NW Traitors LTF Site #18 to N. Traitors LTF Site #22: This connection would require 2 miles of road, part of which would be on excessively steep slopes. This route would require an easement for an additional 1.25 miles of road in State selected land.

Construction of a NW Traitors LTF to N. Traitors LTF would cost \$600,000. Approximately 18 acres of productive land would be disturbed. The additional construction costs for connecting to, and using, N. Traitors LTF is about \$857,000 more than the proposed action.

Fuel use and haul costs would increase \$41,000.

Visual impacts would be high on the NW Traitors LTF to N. Traitors LTF connection because of the steep slopes.

Sub-alternatives to the proposed reconstruction of the LTF:

Dry Land Bulkhead to Barge Transfer: Modification of the proposed site for barge loading would require extension of the fill and construction of a bulkhead to reach deep water. A 3- to 5-acre sort yard would need to be constructed inland from the site. The operating area would need to be increased in size. The timber resource in this area would not economically support development of this system.

Modifying to a barge system would require an easement for additional sort yard and operating area.

The conversion to barge loading and sort yard would cost approximately \$1,000,000. Haul and fuel use would be about the same as the proposed action.

Chain Slide System: Modification to a chain slide would require additional rock fill to reach adequate water depths. The operating area would effect 0.4 acres of upland, and the chain slide and fill would effect 0.3 acres of aquatic habitat. Construction costs would be about \$328,000. Haul costs would be the same as the proposed action.

A-Frame System: Modification to an A-Frame system would require an extensive fill and bulkhead to reach adequate water depths. The bathymetric characteristics are not favorable for an A-Frame system. Approximately 0.5 acres of aquatic habitat would be effected. Construction costs would be approximately \$415,000. Haul would be the same as the proposed action.

Determine if: **(ii) The proposed discharge will result in significant degradation of the aquatic ecosystem;**

SW Neets Bay LTF Site #17 is an existing site that has steep bathymetric characteristics with strong tidal currents and depths that will provide good flushing, minimizing impacts to the aquatic ecosystem.

The proposed A-Frame system is capable of transferring logs at entry velocities of 3ft/sec and less. This capability will minimize discharge of bark into the aquatic ecosystem.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

Consolidation of LTF sites, where practicable, minimizes degradation of the aquatic ecosystem by avoiding impacting additional areas.

Determine if: **(iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;**

The existing site was originally an A-Frame system. Use of the same system type will create the least impacts to both the uplands and aquatic ecosystems. The A-Frame is capable of controlling entry velocities to 3ft/sec and under.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

The minor reconstruction of the existing A-Frame and bulkhead with guide rails is preferred to relocation, connecting to other areas, or modification into other systems.

Connection of the NW Traitors LTF tributary area to the SW Neets Bay LTF facility is practicable, thus minimizing potential harm to the aquatic ecosystem.

CONNECT N. TRAITORS LTF Site #22 TO SW NEETS BAY LTF Site #17

Includes consolidation of LTF sites by connecting the N. Traitors tributary area to SW Neets Bay LTF Site #17. See Attachment D.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

The N. Traitors LTF Site #22 is a new facility requiring construction of a rock fill and bulkhead with guide rails or connection to the existing SW Neets Bay LTF Site #17.

The area tributary to the N. Traitors LTF includes the area adjacent to the north side of central Traitors Cove

The tributary area contains 1334 acres of harvestable timber, of which 319 acres are proposed for harvest.

Alternatives to connection of proposed N.Traitors LTF Site #22 to SW Neets Bay LTF Site #17:

No action alternative: No harvest of timber resources in the tributary areas.

Relocate LTF

Construct proposed N. Traitors LTF Site #22

Connect N. Traitors LTF Site #22 to existing Fire Cove LTF Site #16²

Connect N. Traitors LTF Site #22 to proposed NW Traitors LTF Site #18¹

Sub-alternatives to the proposed LTF construction:

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

Low-angle ramp

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to 1334 acres of timber resources would be foregone.

Relocate LTF: The upland topography and bathymetry in Neets Bay is very steep making relocation non-practicable. Other sites were investigated but were unsuitable or did not meet Alaska Timber Task Force Siting Guidelines. No environmental advantages would be gained due to the difficulty of the terrain.

Construct N. Traitors LTF Site #22: Construction of an A-Frame and bulkhead LTF will require a fill that would cover 0.2 acre of aquatic habitat and 0.5 acre of upland area.

Construction of the N. Traitors LTF would cost \$383,300.

The structure would create visual impacts due to the bulkhead and cut and fill slopes.

Connect N. Traitors LTF Site #22 to Fire Cove LTF Site #16: Connecting the Fire Cove area to the N. Traitors LTF Site #22 area would require 1 mile of road. The route lies on very steep slopes with high risk of mass movement. This alternative would cost about \$400,000. Visual impacts would be high. The route would create 9 acres of disturbance to productive land.

The additional construction costs of connecting and using Fire Cove LTF would be \$309,000 more than using N. Traitors LTF.

Fuel and haul costs would increase \$124,000 over transferring logs at N. Traitors LTF.

From a visual standpoint, numerous large cuts would be visible from Traitors Cove. Road construction on several excessively steep areas would create a high risk of mass movement.

Connect N. Traitors LTF Site #22 to NW Traitors LTF Site #18: This connection would require 2.0 miles of road, part of which would be on excessively steep slopes. The route would require an easement for an additional 1.25 miles of road in State selected land.

Construction of a NW Traitors LTF to N. Traitors LTF connection would cost \$600,000. Approximately 18 acres of productive land would be disturbed. The additional construction costs for connecting to, and using, NW Traitors LTF is about \$343,000 more than using N. Traitors LTF.

Fuel use and haul costs would increase \$57,000.

Visual impacts would be high on the N. Traitors LTF to NW Traitors LTF connection because of the steep slopes.

Connect N. Traitors LTF Site #22 to existing S.W Neets Bay LTF Site #17: Connecting these areas would require about 0.8 mile of road, of which 500 feet would be on excessively steep slopes. The connection will have very steep adverse grades requiring restricted load sizes and higher than normal haul costs. The connection would disturb 7.0 acres of productive land.

Fuel and haul costs would increase 161,000.

A savings of \$58,000 in construction costs would be realized by connecting and using SW Neets Bay LTF rather than building and using N. Traitors LTF.

Visual impacts from view points on Traitors Cove would be moderate.

Sub-alternatives to the proposed reconstruction of the LTF:

Dry Land Bulkhead to Barge Transfer: Modification of the site for barge loading would require increasing the fill and construction of a bulkhead to reach deep water. A 3- to 5-acre sort yard would need to be constructed inland from the site. The operating area would need to be increased in size. The site is surrounded by steep topography, requiring massive rock cuts to expand the site. About 0.3 acre of aquatic habitat and 4.5 acres of upland area would be impacted.

Development as a barge loading system would cost approximately \$1,000,000. Haul and fuel use would be about the same as the proposed action.

Because of the steepness of the terrain, a sort yard could not be practicably developed within a reasonable distance of the LTF site.

Chain Slide System: Due to steep topography and bathymetry, modification to a chain slide would require massive upland excavation to provide an operating area as this system would not accommodate a cut-fill balanced structure. The upland operating area would impact an additional 0.5 acres of land. The fill and chain slide structure would impact 0.2 acres of aquatic habitat.

Construction costs would be about \$418,000.

Low-Angle Ramp: Modification to a low-angle ramp could not be accommodated due to the upland topographical and steep bathymetric characteristics of the site.

Determine if: (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem;

SW Neets Bay LTF Site #17 is an existing site that has steep bathymetric characteristics with strong tidal currents and depths that will provide good flushing, minimizing impacts to the aquatic ecosystem.

The proposed A-Frame system is capable of transferring logs at entry velocities of 3ft/sec and less. This capability will minimize discharge of bark into the aquatic ecosystem.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

Consolidation of LTF sites, where practicable, minimizes degradation of the aquatic ecosystem by avoiding impacting additional areas.

Determine if: (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;

The existing site was originally an A-Frame system. Use of the same system type will create the least impact to both the uplands and aquatic ecosystems. The A-Frame is capable of controlling entry velocities to 3ft/sec and under.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

The minor reconstruction of the existing A-Frame and bulkhead with guide rails is preferred to relocation, connecting to other areas, or modification into other systems.

Connection of the N. Traitors LTF tributary area to the SW Neets Bay LTF facility is practicable, thus minimizing potential harm to the aquatic ecosystem.

REACTIVATION OF MARGARET BAY LTF Site #24

Includes reconstruction of the the existing LTF. Reactivation would be accomplished by replacing the A-Frame lift-off system, bulkhead, and guide rails. See Attachment D.

Evaluation of Alternatives:

Determine if: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences;

Description:

The Margaret Bay LTF Site #24 is an existing facility requiring reactivation or relocation.

The area tributary to the Margaret Bay LTF includes the Margaret Creek drainage area, lands adjacent to the south shore of Traitors Cove and the Francis Cove-Indian Point area.

The tributary area contains 5658 acres of harvestable timber, of which 2330 acres are proposed for harvest.

Alternatives to reactivation of Margaret Bay LTF:

No action alternative: No harvest of timber resources in the tributary areas.

Relocate LTF

Connect Margaret Bay LTF Site #24 to existing Fire Cove LTF Site #16³

Sub-alternatives to the proposed LTF reconstruction:

Dry land transfer from bulkhead to barge⁴

Chain slide system⁴

Low-angle ramp

Other alternatives not demonstrated as practicable were not considered further, for example, pile supported bridge ramp and barge or special slide out ramps, etc.

Evaluation between alternatives:

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to 5658 acres of timber resources would be foregone.

Relocate LTF: Relocation of the LTF would create new impacts to an undisturbed portion of the aquatic habitat. The upland topography and bathymetry in Neets Bay is very steep making relocation non-practicable.

Reactivate existing Margaret Bay LTF Site #24: (Preferred Alternative) Reactivation of the existing LTF will require the least impact on both the uplands and aquatic ecosystems. Using the A-Frame method with replacement of the brow and guide rails minimizes changes in the foot print in the aquatic and upland ecosystems. Monitoring dive surveys have shown that this site has excellent flushing characteristics. Monitoring dive operations conducted in 1992 indicate only traces of bark deposits were found at the site.

Reactivation of the Margaret Bay LTF would cost \$350,000. No expansion is expected, however, additional rock fill will be placed under the rails for support.

Reactivate Margaret Bay LTF Site #24 and connect to Fire Cove LTF Site #16: Reactivation of the Margaret Bay LTF would be as described previously. The connection to Fire Cove would require 1.5 miles of road on some excessively steep side slopes. Some of the route would have large rock cuts.

Connecting Traitors Creek area to Margaret Bay LTF Site #24 would be for administrative purposes. This would not alleviate the need for both the Fire Cove and Margaret Bay LTF's as several operators will be using these LTF's concurrently within the 5 year planning period.

A connection from Traitors Creek to Margaret Bay would cost about \$525,000. The route would disturb approximately 14 acres of productive land.

From a safety stand point, the road connection would eliminate small boat travel from Traitors Cove or Ketchikan to Neets Bay via Behm Canal. Small boat travel in Behm Canal is subject to weather conditions. To minimize boat travel, crew quarters would be needed at Fire Cove unless a road connection is made. If the road connection is made, the Fire Cove and Traitors Creek areas could be managed from the USFS 16 person work center adjacent to the Margaret Bay LTF. The connection is dependent upon availability of funding.

This alternative would not increase fuel use and haul costs as the timber tributary to each LTF will not change unless all timber is hauled to only one of the LTF's. This is unlikely as it is expected that both LTF's will be used concurrently by several operators. However, if all timber volume was hauled to Fire Cove LTF the costs would increase \$1,807,000.

From a visual standpoint, some large cuts on the road connection would be visible from Traitors Cove.

Sub-alternatives to the proposed reconstruction of the LTF:

Dry Land Bulkhead to Barge Transfer: Modification of the existing site for barge loading would require extension of the fill and construction of a bulkhead to reach deep water. A 3- to 5-acre sort yard would need to be constructed inland from the site. The operating area would need to be increased in size.

The conversion to barge loading and sort yard would cost approximately \$680,000. Haul and fuel use would be about the same as the proposed action.

The sort yard would create 3- to 5-acres of additional impacts to the uplands. Additionally, the sort yard could not be located within a reasonable distance of the LTF due to State land selection adjacent to the LTF.

Chain Slide System: Due to bathymetric characteristics, reconfiguration to a chain slide would require removal of much of the existing fill and expansion of the upland operating area due to loss of the fill area. Haul costs would be about the same as the proposed action. The site characteristics are not conducive to use of a chain slide.

Low-Angle Ramp: Modification to a low-angle ramp could not be accommodated due to the upland topography and steep bathymetric characteristics of the site.

Determine if: (ii) **The proposed discharge will result in significant degradation of the aquatic ecosystem;**

Margaret Bay LTF Site #24 is an existing site that has steep bathymetric characteristics with strong tidal currents and depths that will provide good flushing, minimizing impacts to the aquatic ecosystem.

The proposed A-Frame system is capable of transferring logs at entry velocities of 3ft/sec and less. This capability will minimize discharge of bark into the aquatic ecosystem.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources, applicable to State NPDES programs, see 40 CFR 123.25.)

Determine if: (iii) **The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem;**

The existing site was originally an A-Frame system. Use of the same system type will create the least impact to both the uplands and aquatic ecosystems. The A-Frame system is capable of controlling entry velocities to 3ft/sec and under.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40 CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25.)

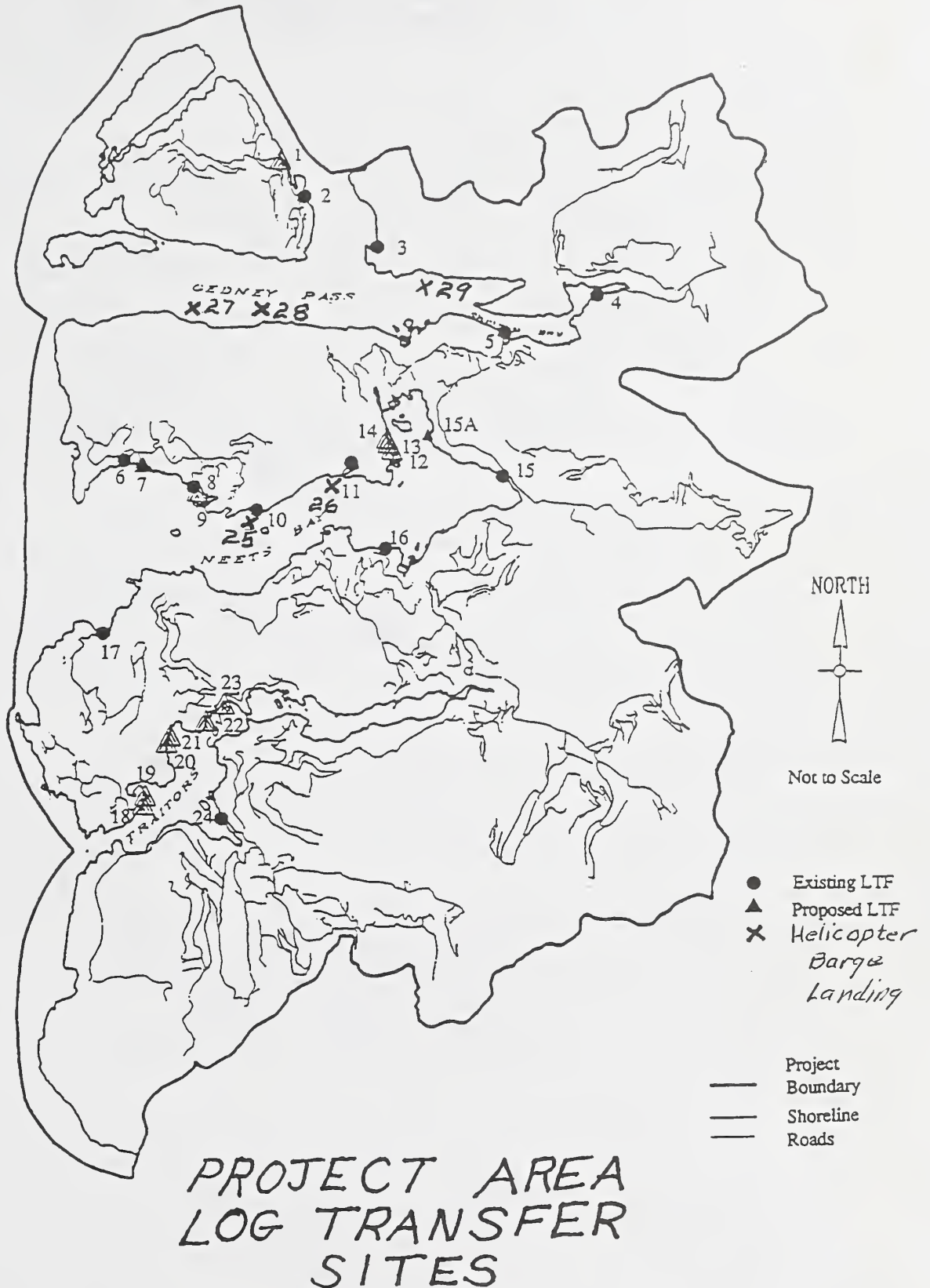
The reactivation of the existing A-Frame and bulkhead with guide rails is preferred to relocation or modification into other systems. The

site has demonstrated excellent flushing characteristics thus minimizing harm to the aquatic ecosystem. Reactivation of the existing site minimizes changes in foot print size.

END NOTES

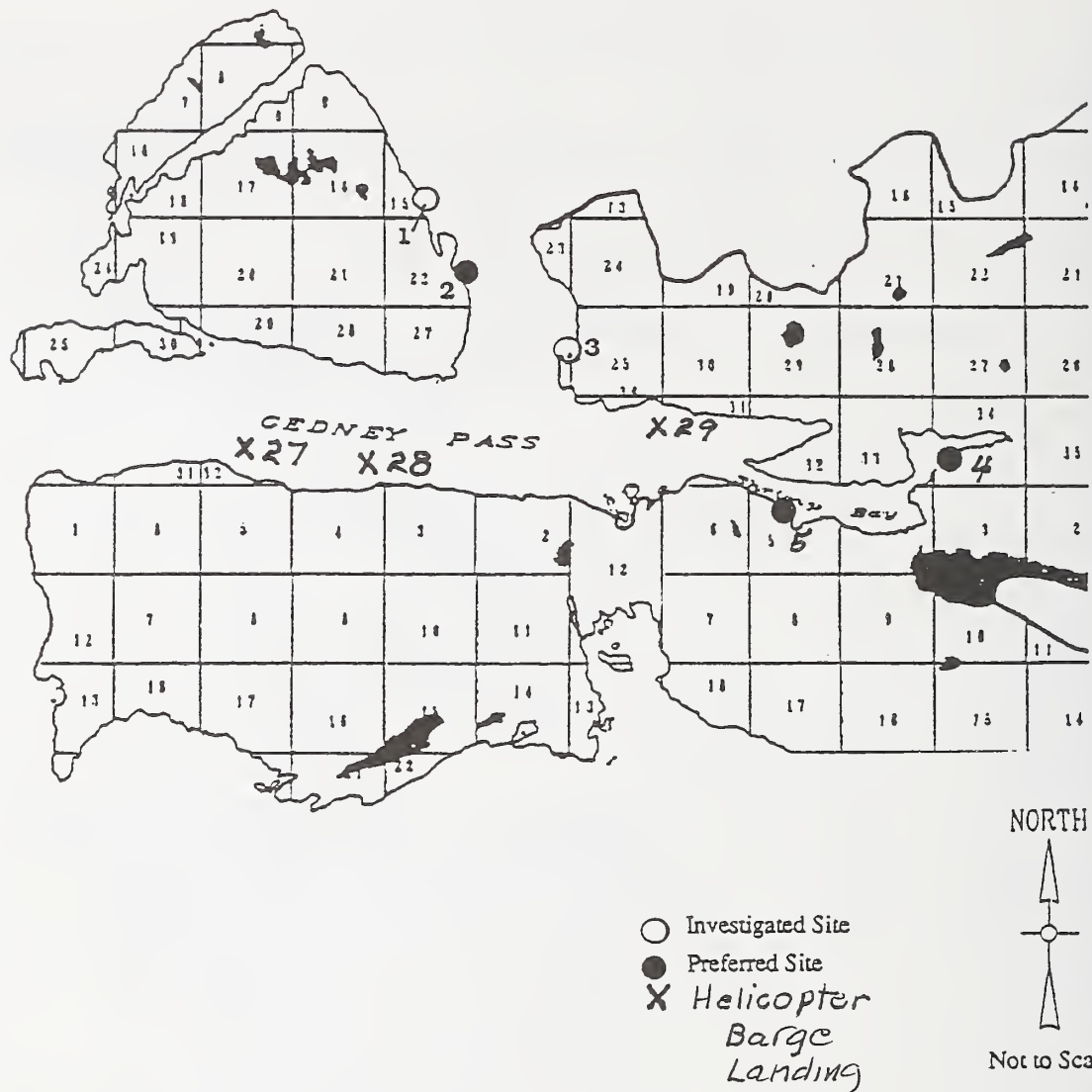
- 1 Verified by aerial photos and maps. Beach road with full bench rock cuts.
- 2 Verified by aerial photos and maps. Full bench road on steep mountain side with slides or potential mass movement. Suggests limited feasibility.
- 3 Verified by aerial and on the ground reconnaissance.
- 4 Subsurface investigation to determine engineering feasibility of foundation requirements has not been made. Feasibility is estimated based on on-site surface characteristics and conditions.

ATTACHMENT A



ATTACHMENT A

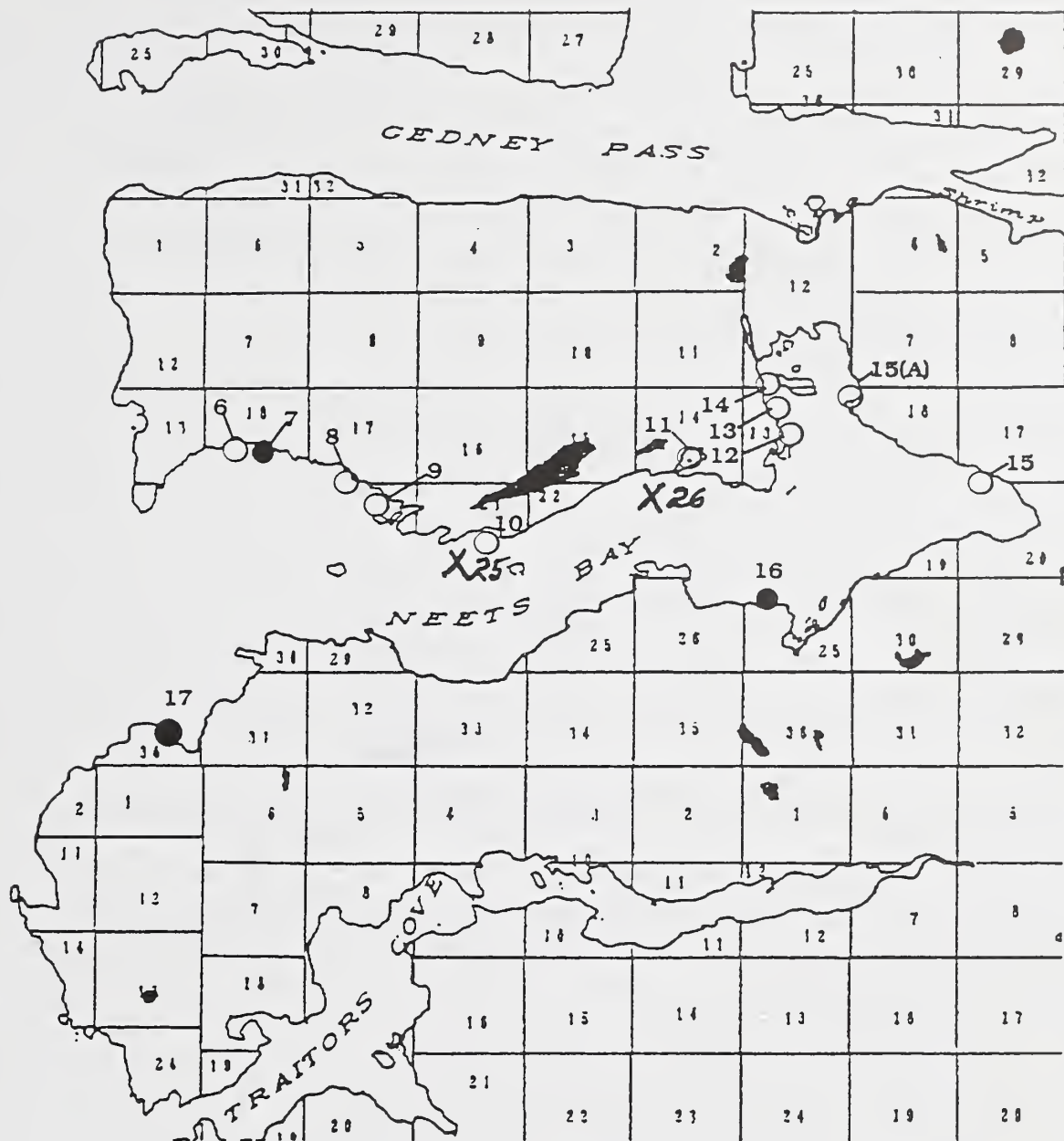
ATTACHMENT B



HASSLER ISLAND
SHRIMP BAY
AREA LTF SITES

ATTACHMENT B

ATTACHMENT C



NEETS BAY
AREA LTF
SITES

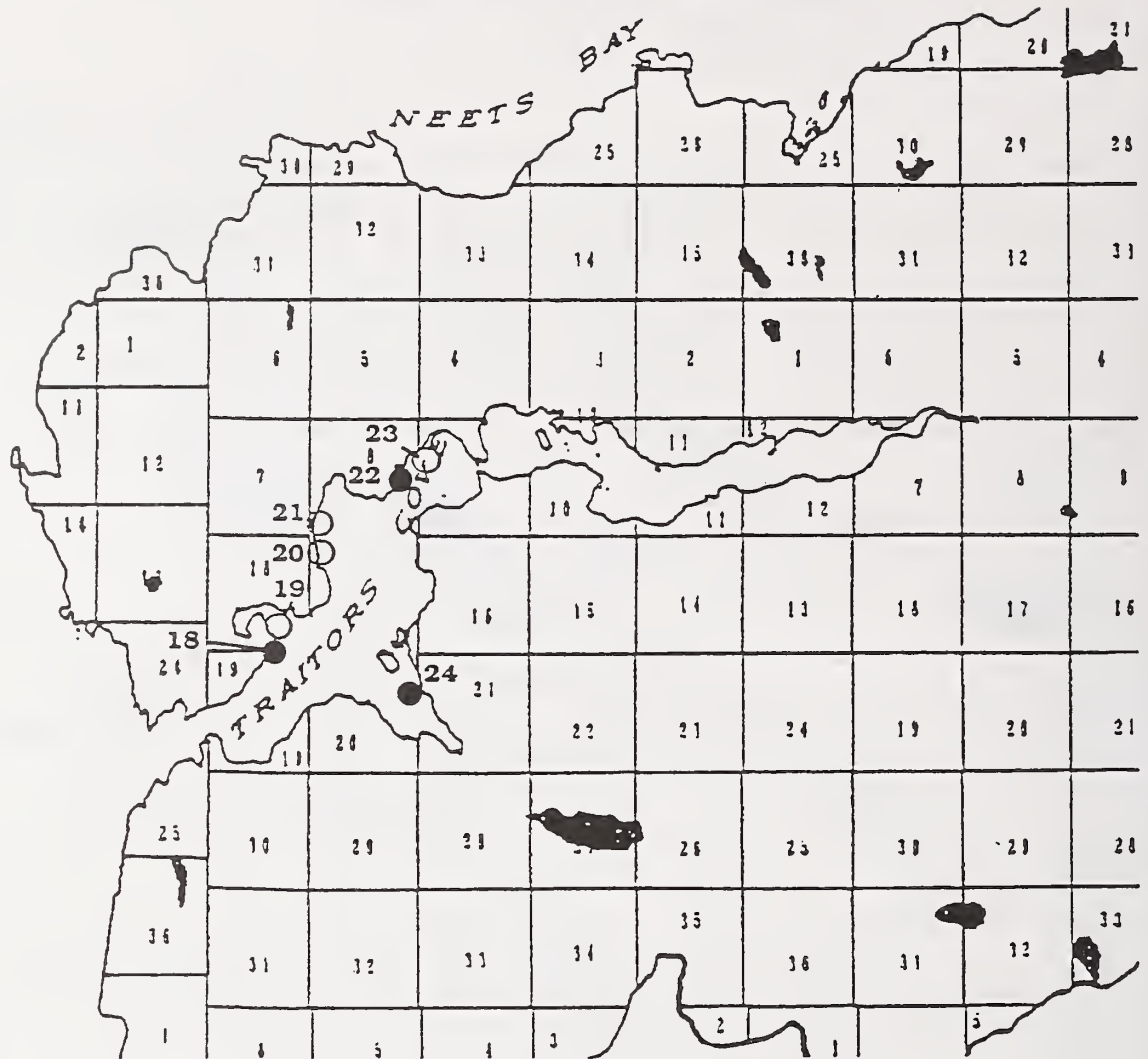
- Investigated Site
- Preferred Site
- X Helicopter Landing



Not to Scale

ATTACHMENT C

ATTACHMENT D



- Investigated Site
- Preferred Site



Not to Scale

TRAITORS COVE
AREA LTF SITES

ATTACHMENT D

Appendix H

Silviculture Diagnosis

SILVICULTURE DIAGNOSIS

The first step in the selection of an appropriate silvicultural system for an individual site is the diagnosis. After an examination of the pertinent data (tree species, plant association, windthrow risk, stocking, elevation, aspect, soil type, productivity, etc.) a range of acceptable treatments (including deferred entry) is prescribed. Treatments considered include such things as site preparation, planting, surveys, precommercial thinning, pruning, commercial thinning, and regeneration harvests. Due to the fact that most sites in SE Alaska are composed of overmature stands the range of treatments is usually limited to regeneration harvests or deferred entry.

Regeneration harvest methods include even-aged (clearcut, shelterwood and seed tree) and uneven-aged (individual tree selection and group tree selection). Factors other than the silvical or ecological limitations of the species weigh heavily in the choice between regeneration harvest methods. These include economic considerations, other resource values, terrain considerations with its limitations on logging systems, and other operational environmental considerations such as the presence or absence of dwarf mistletoe, susceptibility to windthrow, and susceptibility to logging damage. Therefore an acceptable treatment is one that is feasible and will achieve sound silvicultural objectives. Silvicultural objectives include species composition, stand condition class, growth rate, density, insect and disease control, and stand development over time.

The interdisciplinary team (IDT) has utilized the Forest Plan, management concerns and public issues to determine specific objectives for the site. The IDT can select the silvicultural system that best meets the objectives or the deferred entry (no action) can be selected for any or all sites. In order to meet the issues and concerns reflected in the various alternatives, one or more silvicultural systems may be selected for the same site depending upon the alternative. A detailed silvicultural prescription will be prepared for each unit within the selected alternative identified in the Record of Decision prior to final unit layout.

The following section describes the information and codes displayed in the diagnosis.

H		SILVICULTURE DIAGNOSIS - ALTERNATIVE #X																PAGE _ OF _							
AU	RN	-----																							
VI	VI	V	V	V	S	T	I	R	M	HM															
EI	EI	O	O	O	L	WH	SN	I	PH	LE	AE														
ST	ST	L	L	L	P	IR	M	ID	AA	OT	RT	PROPOSED													
VCU T#	VCU T#	C4	C5	C6	C7	ACRES	VOLUME	MMBF	ASPECT	VQO	E	ELEV	DW	SMU	CODE	I	G	EX	HAB	RB	GH	VH	FUTURE MANAGEMENT		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

- 1< VCU or Value Comparison Unit. Used to subdivide Management Areas (K32) and are generally equivalent to third order watersheds.
- 2< Harvest Unit Number. A four digit number, the first digit is the last non zero number in the VCU number. The last three digits represent a unique configuration or grouping of settings. For example Harvest Unit #2001 is located in VCU 732 and is unit configuration number 001. It may occur in one or more alternatives but always has the same size and shape. A different configuration will be assigned a unique harvest unit number.
- 3< LUD or Land Use Designation. Land use allocation assigned through TLMP as amended 1991.
- 4< REV LUD - Land Use Designation or Management Prescription proposed under Alternative P of the TLMP Revision DEIS.
- 5< Volume Class 4 stand acres consisting of 8-20 MBF/Ac
- 6< Volume Class 5 stand acres consisting of 20-30 MBF/Ac
- 7< Volume Class 6 stand acres consisting of 30-50 MBF/Ac
- 8< Volume Class 7 stand acres consisting of 50 + MBF/Ac
- 9< Total Acres within the setting and summarized by Harvest Unit#. Alternative total is also displayed
- 10<Volume of each setting and summarized by Harvest Unit#. Volume is displayed in MBF (Thousand Board Feet)
- 11<Aspect is the predominant direction the slope faces (North,East,South or West)
- 12<Visual Quality Objective based on the proposed Alternative P LUD's and the distance zone (foreground,middleground,background)
- 13<Slope Class based on soils inventory. Code 1 = 0-35%; Code 2 = 36-55%; Code 3 = 56-75%; Code 4 = >75%
Note: Reliability is limited as the slope is an average for a large soil mapping unit. The setting (avg size 18 acres) may or may not reflect the average.
- 14<Minimum Elevation - The lowest elevation recorded for the setting rounded to the nearest 100 feet. 1 = 100'; 8 = 800'; 15 = 1500'
- 15<Maximum Elevation - The highest elevation recorded for the setting rounded to the nearest 100 feet. (see above)
- 16<Wind Throw - The risk of windthrow based on topographic and species factors (H = High Risk, M = Low Risk, L = Low Risk) Harris, PNW-GTR-244
- 17<Soil Mapping Unit - A setting may contain one or more mapped soil types. The predominant soil type is listed. For interpretation of soil mapping unit codes see R-10 Soil & Water Handbook.
- 18<Ecological Codes - See Ketchikan Area Plant Associations Guide (Dimeo) for interpretations.
- 19<Mass Movement Index - MMI 1 = Low Hazard; MMI 2 = Moderate Hazard; MMI 3 = High Hazard; MMI 4 = Very High Hazard; Note listed for item 13 applies to MMI codes as well.
- 20<Percent McGilvery Soils. Used to indicate potential regeneration problems. Code 1 = 0-9%; 2 = 10-19%; 3 = 20-29%; 4 = 30-39% and 5 = 40-100% McGilvery Soils.

- 21<Site Index - Measure of productivity and is based on a 50 year period. ie a site with an index of 85 will produce trees 85 feet tall in 50 years.
- 22<Wetland Habitat Codes - Indicates the type of wetland or non wetland habitat. Used as an indicator of logging system requirements.
- 23<Riparian Habitats - Based on soil mapping units not AHMU prescriptions. Used to indicate potential regeneration problems.
- 24<Logging Method - Type of logging system recommended to meet all resource concerns including suspension requirements. Codes include HL = Highlead RS = Running Skyline; LS = Live Skyline (shotgun or flyer); SL = Slackline (live skyline w/haulback); SS = Standing Skyline; MS = Multi-span Skyline; HE = Helicopter; CD = Cold Deck and Swing operation. A-frame logging is primarily used for salvage logging due to the 500' beach fringe and 1000' estuary buffer being applied in this EIS.
- 25<Harvest Method - CC = clearcut; SW = Two step shelterwood that totally exclude's Alaska yellowcedar; SWD = Two Step shelterwood that harvests Alaska yellowcedar larger than 12-16" DBH (depending upon the site) and leaves the Alaska yellowcedar smaller than the specified diameter for seed production and shelter.
- 26<Proposed Future Management - Codes include the following:
 FH = Final Harvest (Overstory Removal after advance regeneration established)
 RS = Regeneration Survey 3rd & 5th years after harvest
 PB = Prescribed Burn
 Plant (SS,RC,YC) = Plant Sitka Spruce, Western Redcedar, or Alaska yellowcedar
 SS = Survival Surveys (staked tree surveys and regeneration surveys) in plantations
 TMPCT = Timber precommercial thinning 12'X12' at age 15-20 years recommended
 WLPCT = Wildlife precommercial thinning 12'X12' to 16'X16' spacing recommended between ages of 12 and 20. On an average site the onset of crown closure and reduced radial increment occurs at age 18. To avoid losing desirable understory forage thinning should occur before or shortly after the onset of canopy closure. Variation due to site quality needs to be accounted for.
 CT = Commercial Thinning
 CC = Clearcut
 SW = Shelterwood

SILVICULTURE DIAGNOSIS - ALTERNATIVE #2

SILVICULTURE DIAGNOSIS - ALTERNATIVE #2																												PAGE 1 OF 24																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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NORTH REVILLA FINAL EIS - APPENDIX H

NORTH REVILLA FINAL EIS - APPENDIX H

SILVICULTURE DIAGNOSIS - ALTERNATIVE #2																																	PAGE 6 OF 24																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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SILVICULTURE DIAGNOSIS - ALTERNATIVE #2

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SILVICULTURE DIAGNOSIS - ALTERNATIVE #2

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7360	6013	4	TP	4	TP	4	4	6	0	0	0	0	0	0	10	288.00		NORTH	MO	2	15	15	M	4D	CMB	2	1	80	FW	N	HL	CC	PLANT(YC),SS,CT,SW																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

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7370	7021	4	TP	0	16	0	0	0	16	502.00	SOUTH	MM	3	15	15	H	19E	WHS	WHS	3	1	73	FW	N	RS	CC	RS, CC
7370	7021	4	TP	0	16	0	0	0	16	502.00	EAST	MM	3	9	11	H	1E	WDC	WDC	3	1	100	FW	N	RS	CC	RS, TMPCT, CC
7370	7021	4	TP	0	7	0	0	0	7	220.00	SOUTH	MM	3	15	15	M	4E	CCD	CCD	3	1	70	FW	N	RS	CC	RS, CC
7370	7021	4	TP	1	6	0	0	0	7	213.00	EAST	MO	3	11	12	H	4E	CCD	CCD	3	1	70	FW	N	RS	CC	RS, R&W, CC
7370	7021	4	TP	0	13	0	0	0	13	408.00	EAST	MO	3	9	10	H	1E	WDC	WDC	3	1	100	FW	N	HL	CC	RS, TMPCT, CC
7021		1	58	0	0	0	0	0	59	1,845.00																	
7370	7022	4	TP	7	0	0	0	0	7	175.00	NORTH	MO	2	8	9	H	4D	CMB	CMB	2	1	70	FW	N	HL	CC	RS, CC
7370	7022	4	ML	7	0	0	0	0	7	175.00	NORTH	MO	3	6	8	H	3E	WDC	WDC	3	1	100	FW	N	RS	CC	RS, TMPCT, CC
7370	7022	4	ML	4	0	0	0	0	4	100.00	NORTH	MO	2	4	10	H	4D	CMB	CMB	2	1	70	FW	N	HL	CC	RS, CC
7370	7022	4	ML	6	0	0	0	0	6	150.00	NORTH	MO	4	7	7	H	6	CCS	CCS	2	5	85	FW	N	RS	CC	RS, TMPCT, CC
7370	7022	4	TP	3	0	0	0	0	3	75.00	NORTH	MO	2	8	9	H	4D	CMB	CMB	2	1	70	FW	N	RS	CC	RS, CC
7370	7022	4	ML	5	0	0	0	0	5	124.00	NORTH	MO	2	8	8	H	3D	WDC	WDC	2	1	100	FW	N	RS	CC	RS, TMPCT, CC
7022		32	0	0	0	0	0	0	32	799.00																	
7370	7023	4	TP	0	25	0	0	0	25	784.00	NORTH	MO	4	7	11	H	528F	WHS	WHS	3	4	85	FW	N	SL	CC	RS, TMPCT, CC
7370	7023	4	TP	0	8	0	0	0	8	251.00	NORTH	MO	3	8	9	H	33E	WHS	CCS	3	4	75	FW	N	RS	CC	RS, TMPCT, CC
7370	7023	4	TP	0	9	0	0	0	9	283.00	NORTH	MO	4	10	11	H	528F	WHS	WHS	3	4	85	FW	N	HL	CC	RS, TMPCT, CC
7370	7023	4	TP	0	17	0	0	0	17	534.00	NORTH	MO	4	9	11	H	528F	WHS	WHS	3	4	85	FW	N	HL	CC	RS, TMPCT, CC
7370	7023	4	TP	0	9	0	0	0	9	283.00	NORTH	MO	4	8	9	H	528F	WHS	WHS	3	4	85	FW	N	HL	CC	RS, TMPCT, CC
7370	7023	4	TP	0	6	0	0	0	6	188.00	NORTH	MO	4	11	11	H	528F	WHS	WHS	3	4	85	FW	N	HL	CC	RS, TMPCT, CC
7023		0	74	0	0	0	0	0	74	2,323.00																	
7370	7024	4	ML	0	4	0	0	0	4	125.00	NORTH	MM	4	10	10	H	528F	WHS	WHS	3	4	85	FW	N	HE	CC	RS, TMPCT, CC
7370	7024	4	ML	0	6	0	0	0	6	188.00	NORTH	MM	4	12	12	H	528F	WHS	WHS	3	4	85	FW	N	HE	CC	RS, TMPCT, CC
7370	7024	4	ML	0	16	0	0	0	16	502.00	NORTH	MM	4	11	15	H	528F	WHS	WHS	3	4	85	FW	N	HE	CC	RS, TMPCT, CC
7024		0	26	0	0	0	0	0	26	815.00																	
7370	7025	4	TP	15	5	0	0	0	20	532.00	WEST	MM	4	20	30	H	35F	MHB	MHB	4	1	90	FW	N	HE	CC	RS, CC
7370	7026	4	TP	0	15	0	0	0	15	471.00	NORTH	MO	4	8	11	H	528F	WHS	WHS	3	4	85	FW	N	HE	CC	RS, TMPCT, CC
7370	7026	4	TP	0	39	0	0	0	39	1,223.00	NORTH	MO	4	7	15	H	528F	WHS	WHS	3	4	85	FW	N	HE	CC	RS, TMPCT, CC
7370	7026	4	TP	0	15	0	0	0	15	471.00	NORTH	MO	4	12	15	H	528F	WHS	WHS	3	4	85	FW	N	HE	CC	RS, TMPCT, CC
7026		0	69	0	0	0	0	0	69	2,165.00																	
7370	7027	4	TP	0	35	0	0	0	35	1,098.00	NORTH	MO	4	6	15	H	528F	WHS	WHS	3	2	24	FW	N	HE	CC	RS, CC
7370	7028	4	TP	0	14	0	0	0	14	439.00	NORTH	MM	4	12	15	H	528F	WHS	WHS	3	4	85	FW	N	HE	CC	RS, TMPCT, CC

NORTH REVILLA FINAL EIS - APPENDIX H

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7390 9529	3 TP	2	2	0	0	0	0	0	0	0	0	0	0	0	4	112.00		EAST	MM	2	2	8	M	4D	CMB	2	1	70 FW	N	RS	CC	RS,R&W,CC
7390 9529	3 TP	0	6	0	0	0	0	0	0	0	0	0	0	0	6	188.00		EAST	MM	3	11	11	M	11E	WDC	3	1	100 FFW	N	RS	CC	RS,TMPCT,CC
7390 9529	3 TP	0	27	0	0	0	0	0	0	0	0	0	0	0	27	933.00		NORTH	MM	2	3	7	H	10	SSR	1	1	97 FFW	Y	SL	CC	PLANT(S),SS,CC
7390 9529	3 TP	3	5	0	0	0	0	0	0	0	0	0	0	0	8	232.00		EAST	MM	3	0	15	M	11E	WDC	3	1	87 FFW	N	RS	CC	RS,R&W,CC
7390 9529	3 TP	2	16	0	0	0	0	0	0	0	0	0	0	0	18	551.00		EAST	MM	3	11	15	M	11E	WDC	3	1	91 FFW	N	RS	CC	RS,R&W,CC
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SILVICULTURE DIAGNOSIS - ALTERNATIVE #3

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SILVICULTURE DIAGNOSIS - ALTERNATIVE #3

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H	AU	RN	VI	EI	ST	T#	V	RL	U	D	C4	C5	V	V	V	C6	C7	TOTAL	VOLUME	ASPECT	VQO	E	ELEV	DW	SMU	ECO	CODE	I	M	C	G	EX	HAB	RB	GH	VH	PROPOSED	FUTURE MANAGEMENT				
VCU	T#	D	VD	L	U	RL	O	L	O	L	O	O	O	O	O	O	P	MIN	MAX	NO	IR	WH	T	S	L	O	I	SN	ID	TE	WET	AA	OT	PH	LE	AE	HM	R	I	M		

7350 5027	3 TP	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	188.00	NORTH	MM	2	6	6	H	540	WHS	2	4	90	FNW	N	RS	CC	RS, TMPCT, CC	
7350 5027	3 SV	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	564.00	NORTH	MM	2	8	11	H	540	WHS	2	4	90	FNW	N	HL	CC	RS, TMPCT, CC	
7350 5027	3 SV	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	251.00	NORTH	MM	2	8	12	H	540	WHS	2	4	90	FNW	N	HL	CC	RS, TMPCT, CC	
7350 5027	3 SV	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	376.00	NORTH	MM	2	4	7	H	540	WHS	2	4	90	FNW	N	RS	CC	RS, TMPCT, CC	
7350 5027	3 TP	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	376.00	NORTH	MM	2	4	6	H	540	WHS	2	3	77	FNW	N	RS	CC	RS, CC	
7350 5027	3 SV	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	502.00	NORTH	MM	2	6	8	H	540	WHS	2	4	90	FNW	N	RS	CC	RS, TMPCT, CC	
7350 5027	3 SV	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	972.00	NORTH	PR	2	9	15	M	25	CMW	1	4	85	SEC	N	SL	CC	RS, R&W, CC	
5027		0	103	0	0	0	0	0	0	0	0	0	0	0	0	0	103 3,229.00																	
7350 5028	3 SV	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	659.00	NORTH	PR	2	2	5	H	19D	WHC	2	1	65	FW	N	SL	CC	RS, TMPCT, CC	
7350 5029	3 TP	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	175.00	EAST	MO	2	3	3	H	540	WHS	2	4	90	FNW	N	HL	CC	RS, TMPCT, CC	
7350 5029	3 SV	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	356.00	EAST	MO	2	2	4	H	540	WHS	2	4	82	FNW	N	HL	CC	RS, TMPCT, CC	
7350 5029	3 TP	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	251.00	EAST	MO	3	6	6	H	19E	WHC	3	2	76	FW	N	HL	CC	RS, CC	
7350 5029	3 TP	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	88.00	EAST	MO	3	6	6	H	19E	WHC	3	2	76	FW	N	HL	CC	RS, CC	
5029		21	11	0	0	0	0	0	0	0	0	0	0	0	0	0	32 870.00																	
7350 5030	3 TP	11	6	0	0	0	0	0	0	0	0	0	0	0	0	0	463.00	NORTH	MM	3	3	4	H	33E	CCS	3	4	80	FIW	N	SL	CC	RS, TMPCT, CC	
7350 5031	3 ML	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	63.00	EAST	PR	2	3	4	H	528D	WHS	2	4	85	FNW	N	HL	CC	RS, TMPCT, CC	
7350 5032	3 ML	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	376.00	EAST	PR	2	3	5	H	528D	WHS	2	4	88	FNW	N	RS	CC	RS, TMPCT, CC	
7350 5032	3 ML	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	283.00	EAST	PR	2	6	6	H	540	WHS	2	4	90	FNW	N	HL	CC	RS, TMPCT, CC	
7350 5032	3 ML	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	157.00	EAST	PR	2	6	6	H	540	WHS	2	4	90	FNW	N	HL	CC	RS, TMPCT, CC	
7350 5032	3 ML	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	251.00	EAST	PR	2	4	4	H	528D	WHS	2	4	85	FNW	N	HL	CC	RS, TMPCT, CC	
7350 5032	3 ML	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	188.00	EAST	PR	1	9	9	H	19C	WHC	2	1	65	FW	N	HL	CC	RS, TMPCT, CC	
7350 5032	3 SV	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	283.00	EAST	PR	3	7	9	H	18E	CCD	4	1	80	FW	N	HL	CC	RS, CC	
7350 5032	3 ML	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	95.00	EAST	PR	3	10	10	H	18E	CCD	4	1	80	FW	N	HL	CC	RS, CC	
7350 5032	3 ML	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	157.00	EAST	PR	2	3	3	H	528D	WHS	2	4	85	FNW	N	HL	CC	RS, TMPCT, CC	
5032		0	57	0	0	0	0	0	0	0	0	0	0	0	0	0	57 1,790.00																	
7350 5034	3 ML	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	659.00	SOUTH	PR	2	5	8	H	540	WHS	2	4	85	FNW	N	RS	CC	RS, CC	
7350 5501	3 SV	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	251.00	NORTH	R	2	6	6	H	33D	CCS	3	4	75	FIW	N	RS	CC	RS, TMPCT, CC	
7350 5501	3 SV	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	564.00	NORTH	R	2	3	5	H	33D	CCS	3	4	77	FIW	N	RS	CC	RS, TMPCT, CC	
5501		0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	815.00																	

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H	AU	RN	V1	E1	ST	T#	VCU	L RL	U EU	D VD	V	V	V	V	V	C4	C5	C6	C7	TOTAL	VOLUME	MMBF	ASPECT	VQO	E	P	MIN	MAX	T	WH	IR	NO	DW	SMU	CODE	ECO	I	G	M	C	TE	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M	HM	AE	RT	PROPOSED	VH	GH	RB	HAB	EX	HA	WET	AA	OT	PH	LE	M	I	R	I	M

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SILVICULTURE DIAGNOSIS - ALTERNATIVE #3

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SILVICULTURE DIAGNOSIS - ALTERNATIVE #3

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W	WH	IR	MAX	MIN	P	O	L	S	T	I	R	M	C	G	ECO	CODE	RS	CC	PLANT(S)	SS	CC											
7390	9026	3	TP	14	1	0	0	15	382.00	WEST	MM	3	0	15	M 53E	WHS	3	1	00	FNW	N	RS	CC									
7390	9026	3	TP	13	0	0	13	325.00	WEST	MM	3	0	15	M 53E	WHS	3	1	00	FNW	N	RS	CC										
7390	9026	3	TP	10	0	0	10	250.00	WEST	MM	3	15	15	M 53E	WHS	3	1	00	FNW	N	RS	CC										
9026				37	1	0	0	38	957.00																							
7390	9028	3	TP	0	23	0	0	23	722.00	WEST	MM	3	2	4	H 10	SSR	1	1	98	FNW	Y	HL	CC									
7390	9031	3	TP	0	25	2	0	27	867.00	EAST	MM	1	7	9	M 25	CMM	1	1	62	SEC	N	RS	CC									
7390	9031	3	TP	0	12	0	12	376.00	EAST	MM	2	8	9	M 18D	CCD	3	2	81	FW	N	RS	CC										
7390	9031	3	TP	0	13	0	13	408.00	EAST	MM	3	10	11	M 528E	WHS	3	4	85	FNW	N	RS	CC										
9031				0	50	2	0	52	1,651.00																							
7390	9037	3	TP	0	21	0	0	21	659.00	EAST	MM	3	8	10	M 11E	WHC	3	1	00	FNW	N	HL	CC									
7390	9040	3	TP	0	7	0	0	7	220.00	WEST	PR	4	7	8	M 3F	WDC	3	1	00	FNW	N	RS	CC									
7390	9040	3	TP	3	12	2	0	17	534.00	WEST	PR	4	8	10	M 3F	WDC	3	1	00	FNW	N	RS	CC									
7390	9040	3	TP	0	15	1	0	16	512.00	WEST	PR	4	9	10	M 3F	WDC	3	1	00	FNW	N	RS	CC									
9040				3	34	3	0	40	1,266.00																							
7390	9041	3	TP	0	5	4	0	9	321.00	NORTH	MM	2	1	2	H 3D	WDC	2	1	00	FNW	N	RS	CC									
7390	9041	3	TP	0	6	4	0	10	352.00	NORTH	MM	2	2	2	H 3D	WDC	2	1	00	FNW	N	RS	CC									
9041				0	11	8	0	19	673.00																							
7390	9043	3	ML	0	15	0	0	15	471.00	NORTH	MM	3	4	6	H 1E	WDC	3	1	00	FNW	N	HL	CC									
7390	9043	3	ML	4	2	0	0	6	163.00	NORTH	MM	3	5	5	H 1E	WDC	3	1	00	FNW	N	HL	CC									
9043				4	17	0	0	21	634.00																							
7390	9044	3	ML	1	6	20	0	27	1,034.00	NORTH	PR	3	9	15	H 1F	WDC	3	1	97	FNW	N	RS	CC									
7390	9044	3	ML	0	2	17	0	19	760.00	NORTH	MO	4	9	15	H 1F	WDC	3	1	00	FNW	N	RS	CC									
7390	9044	3	ML	0	0	8	0	8	328.00	NORTH	MM	3	7	7	H 1E	WDC	3	1	00	FNW	N	HL	CC									
7390	9044	3	ML	0	5	11	0	16	608.00	NORTH	PR	3	6	7	H 1E	WDC	3	1	00	FNW	N	RS	CC									
9044				1	13	56	0	70	2,730.00																							
7390	9048	3	ML	0	14	0	0	14	439.00	SOUTH	PR	2	3	5	H 74E	WHM	2	1	83	FNW	N	SL	CC									
7390	9048	3	ML	0	10	0	0	10	314.00	SOUTH	PR	2	4	5	H 51C	WHS	1	1	84	FW	N	HL	CC									
7390	9048	3	ML	0	14	0	0	14	439.00	SOUTH	PR	3	3	4	H 2D	WDC	2	1	00	FNW	N	HL	CC									
7390	9048	3	ML	0	13	0	0	13	408.00	SOUTH	PR	1	4	5	H 74C	WHM	2	1	00	FNW	N	SL	CC									
7390	9048	3	ML	0	14	0	0	14	439.00	SOUTH	PR	3	3	5	H 2D	WDC	2	1	00	FNW	N	HL	CC									
9048				0	65	0	0	65	2,039.00																							

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NORTH REVILLA FINAL EIS - APPENDIX H

SILVICULTURE DIAGNOSIS - ALTERNATIVE #4

SILVICULTURE DIAGNOSIS - ALTERNATIVE #4																														PAGE 1 OF 15																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
H	AU	RN	VI	EI	ST	T#	VCU	L RL	U EU	D VD	V	V	V	V	V	C4	C5	C6	C7	TOTAL	VOLUME	MMBF	ASPECT	VQO	E	P	S	L	O	T	WH	IR	MAX	ELEV	DW	SMU	ECO	CODE	I	M	C	G	EX	HAB	WET	AA	OT	PH	LE	AE	HM	R	I	M	LE	AE	RT	VH	PROPOSED	FUTURE MANAGEMENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
7330	3001							3	ML	4	16	0	0	0	0	20	602.00						SOUTH	MO	3	15	20	H	86CD	NME	1	3	69	SEC	N	HE	CC	RS,CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
7330	3002							3	ML	0	27	0	0	0	0	27	847.00						SOUTH	MO	2	3	5	H	33E	CCS	3	4	75	FIW	N	HE	SWD	FH,RS,R&W,2-SW																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
7330	3003							3	ML	35	71	0	0	0	0	106	3,101.00						SOUTH	MO	3	15	20	H	29EF	WHS	1	4	77	FNW	N	HE	CC	RS,R&W,CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
7330	3006							3	ML	52	22	0	0	0	0	74	1,988.00						EAST	MM	4	4	9	H	528F	WHS	3	4	85	FNW	N	SL	CC	RS,TMPCT,CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
7330	3006							3	ML	18	1	0	0	0	0	19	482.00						EAST	MM	4	9	11	H	528F	WHS	3	4	85	FNW	N	SL	CC	RS,TMPCT,CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
7330	3006							3	ML	7	19	0	0	0	0	26	771.00						EAST	MM	4	7	11	H	528F	WHS	3	4	85	FNW	N	SL	CC	RS,TMPCT,CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
3006								77	42	0	0	0	0	0	119	3,241.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

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SILVICULTURE DIAGNOSIS - ALTERNATIVE #4

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AU	RN	VI	EI	ST	T#	VCU	L RL U EU D VD	V O L C4	V O L C5	V O L C6	V O L C7	TOTAL ACRES	VOLUME	MMBF	ASPECT	S VQO E	P MIN ELEV	O MAX NO DW	T WH IR	I SN ID TE WET AA OT RB GH VH	R I M LE AE PH RT	PROPOSED FUTURE MANAGEMENT				
7350	5505	3 ML	0	4	0	0	0	0	0	0	0	4	125.00	NORTH	PR 2	9	9 H	528D	WHS	2	4	85 FNW N HL CC	CC	RS, TMPCT, CC		
7350	5505	3 ML	0	30	0	0	0	0	0	0	0	30	1,002.00	NORTH	PR 2	9	9 H	528D	WHS	2	4	85 FNW N HL CC	CC	RS, TMPCT, CC		
5505			0	34	0	0	0	0	0	0	0	34	1,127.00													
7350	5526	3 SV	1	25	0	0	0	0	0	0	0	26	810.00	NORTH	MM 2	6	11 H	54D	WHS	2	4	90 FNW N RS CC	CC	RS, TMPCT, CC		
7350	5550	3 SV	4	0	0	0	0	0	0	0	0	4	100.00	WEST	MM 2	2	4 H	29D	CCS	1	2	44 FNW N HL CC	CC	RS, CC		
7350	5550	3 SV	0	10	0	0	0	0	0	0	0	10	314.00	NORTH	R 2	6	7 H	51C	WHS	1	1	63 FW N HL CC	CC	RS, TMPCT, CC		
7350	5550	3 SV	11	0	0	0	0	0	0	0	0	11	303.00	NORTH	R 2	6	7 H	51C	WHS	1	2	70 FW N HL CC	CC	RS, CC		
7350	5550	3 SV	0	7	0	0	0	0	0	0	0	7	220.00	NORTH	R 2	11	11 H	19D	WHC	2	1	65 FW N HL CC	CC	RS, TMPCT, CC		
5550			15	17	0	0	0	0	0	0	0	32	937.00													
7350	5551	3 SV	0	9	0	0	0	0	0	0	0	9	283.00	NORTH	PR 2	11	12 H	54D	WHS	2	4	90 FNW N RS CC	CC	RS, TMPCT, CC		
7350	5551	3 SV	0	18	0	0	0	0	0	0	0	18	564.00	NORTH	PR 2	15	20 H	54D	WHS	2	4	87 FNW N RS CC	CC	RS, CC		
7350	5551	3 SV	12	7	0	0	0	0	0	0	0	19	519.00	NORTH	PR 3	15	20 H	54D	WHS	2	4	82 FNW N RS CC	CC	RS, CC		
7350	5551	3 SV	5	0	0	0	0	0	0	0	0	5	124.00	NORTH	PR 2	15	15 H	54D	WHS	2	4	90 FNW N RS CC	CC	RS, TMPCT, CC		
5551			17	34	0	0	0	0	0	0	0	51	1,490.00													
7360	6002	4 ML	9	13	0	0	0	0	0	0	0	22	633.00	NORTH	PR 2	3	5 H	3D	WDC	2	1	89 FNW N HL CC	CC	RS, CC		
7360	6002	4 ML	1	5	0	0	0	0	0	0	0	6	183.00	NORTH	PR 2	2	2 H	3D	WDC	2	1	100 FNW N HL CC	CC	RS, TMPCT, CC		
7360	6002	4 ML	3	6	0	0	0	0	0	0	0	9	263.00	NORTH	PR 2	2	3 H	3D	WDC	2	1	100 FNW N HL CC	CC	RS, TMPCT, CC		
7360	6002	4 ML	6	1	0	0	0	0	0	0	0	7	182.00	NORTH	PR 2	2	3 H	3D	WDC	2	1	100 FNW N HL CC	CC	RS, TMPCT, CC		
6002			19	25	0	0	0	0	0	0	0	44	1,261.00													
7360	6003	4 ML	0	45	0	0	0	0	0	0	0	45	1,411.00	EAST	PR 3	9	20 M	4E	CCD	3	1	74 FW N HE SW	SW	FH, RS, R&W, 2-SW		
7360	6003	4 ML	0	27	0	0	0	0	0	0	0	27	847.00	EAST	PR 3	12	15 M	4E	CCD	3	1	70 FW N HE SW	SW	FH, RS, R&W, 2-SW		
6003			0	72	0	0	0	0	0	0	0	72	2,258.00													
7360	6004	4 ML	10	24	0	0	0	0	0	0	0	34	1,002.00	SOUTH	PR 3	4	7 H	4E	CCD	3	1	97 FW N SL CC	CC	PB, PLANT(RC&YC), SS, CC		
7360	6004	4 ML	5	6	0	0	0	0	0	0	0	11	312.00	SOUTH	PR 3	4	5 H	3E	WDC	3	1	89 FNW N HL CC	CC	RS, CC		
7360	6004	4 ML	4	0	0	0	0	0	0	0	0	4	100.00	SOUTH	PR 3	4	4 H	3E	WDC	3	1	100 FNW N HL CC	CC	RS, WLPT, CC		
7360	6004	4 ML	2	13	0	0	0	0	0	0	0	15	458.00	SOUTH	PR 3	3	4 H	3E	WDC	3	1	82 FNW N RS CC	CC	RS, CC		
7360	6004	4 ML	0	14	0	0	0	0	0	0	0	14	439.00	SOUTH	PR 2	2	3 H	24D	CMC	1	1	75 SE N RS CC	CC	PB, PLANT(RC&YC), SS, CC		
6004			21	57	0	0	0	0	0	0	0	78	2,311.00													
7360	6007	4 TP	26	22	0	0	0	0	0	0	0	48	1,339.00	SOUTH	MO 3	10	20 M	18D	CCD	3	3	72 FW N HE SW	SW	FH, RS, R&W, 2-SW		

SILVICULTURE DIAGNOSIS - ALTERNATIVE #4

NORTH REVILLA FINAL EIS - APPENDIX H

SILVICULTURE DIAGNOSIS - ALTERNATIVE #4

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VCU	T#	L	RL	U	EU	D	VD	C4	C5	V	V	V	V	L	L	L	L	C6	C7	ACRES	TOTAL	VOLUME	MMBF	ASPECT	VQO	E	P	MIN	MAX	NO	T	WH	IR	ECO	CODE	I	G	M	C	M	ID	SN	I	R	M	HM	AE	RT	PROPOSED	FUTURE	MANAGEMENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
7370	7034	4	TP	16	0	0	0	0	0	0	0	0	0	16	399.00	EAST	MO	2	11	15	M	18D	CCD	3	1	80	FW	N	RS	CC	PLANT(YC),SS,CT,SW	RS,CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
7370	7034	4	TP	8	0	0	0	0	0	0	0	0	8	200.00	EAST	MO	2	9	10	H	18D	CCD	3	1	80	FW	N	RS	CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
7034				24	0	0	0	0	0	0	0	0	24	599.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

NORTH REVILLA FINAL EIS - APPENDIX H

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SILVICULTURE DIAGNOSIS - ALTERNATIVE #4

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NORTH REVILLA FINAL EIS - APPENDIX H

SILVICULTURE DIAGNOSIS - ALTERNATIVE #5																												PAGE 5 OF 21									
H	AU	RN	VI	EI	ST	T#	VVCU	L RL U EU D VD	V O L C4	V O L C5	V O L C6	V O L C7	TOTAL ACRES	VOLUME MMBF	ASPECT	VQO	P ELEV	S MIN ELEV	T MAX NO DW	WH IR	I SN ID	M C TE WET	R PH AA OT RT	M HM LE AE	PROPOSED FUTURE MANAGEMENT												
7350	5540							3 ML	8	0	0	0	8	200.00	NORTH	MO	2	4	7 H 528D	WHS	2	4	85 FNW	N RS CC	RS, TMPCT, CC												
7350	5540							3 SV	0	7	0	0	7	220.00	NORTH	R	2	11	11 H 19D	WHS	2	1	65 FW	N HL CC	RS, TMPCT, CC												
7350	5540							3 SV	1	10	0	0	11	339.00	NORTH	R	2	11	11 H 19D	WHS	2	1	65 FW	N HL CC	RS, TMPCT, CC												
5540									9	17	0	0	26	759.00																							
7350	5541							3 SV	1	25	0	0	26	810.00	NORTH	MM	2	6	11 H 54D	WHS	2	4	90 FNW	N RS CC	RS, TMPCT, CC												
7350	5541							3 SV	0	9	0	0	9	283.00	NORTH	MM	2	4	6 H 54D	WHS	2	4	88 FNW	N HL CC	RS, TMPCT, CC												
7350	5541							3 SV	0	6	0	0	6	188.00	NORTH	MM	2	2	4 H 54D	WHS	2	4	90 FNW	N HL CC	RS, TMPCT, CC												
7350	5541							3 SV	4	11	0	0	15	446.00	NORTH	MM	2	10	10 H 25	CMM	1	3	82 SEC	N RS CC	RS, CC												
5541									5	51	0	0	56	1,727.00																							
7360	6002							4 ML	9	13	0	0	22	633.00	NORTH	PR	2	3	5 H 3D	WDC	2	1	89 FNW	N HL CC	RS, CC												
7360	6002							4 ML	1	5	0	0	6	183.00	NORTH	PR	2	2	2 H 3D	WDC	2	1	100 FNW	N HL CC	RS, TMPCT, CC												
7360	6002							4 ML	3	6	0	0	9	263.00	NORTH	PR	2	2	3 H 3D	WDC	2	1	100 FNW	N HL CC	RS, TMPCT, CC												
7360	6002							4 ML	6	1	0	0	7	182.00	NORTH	PR	2	2	3 H 3D	WDC	2	1	100 FNW	N HL CC	RS, TMPCT, CC												
6002									19	25	0	0	44	1,261.00																							
7360	6027							4 ML	0	14	0	0	14	439.00	SOUTH	PR	2	2	3 H 3D	WDC	2	1	100 FNW	N HL CC	RS, WLPCT, CC												
7360	6027							4 ML	0	5	0	0	5	157.00	SOUTH	PR	2	2	2 H 3D	WDC	2	1	100 FNW	N HL CC	RS, WLPCT, CC												
7360	6027							4 ML	0	6	0	0	6	188.00	SOUTH	PR	2	2	2 H 3D	WDC	2	1	100 FNW	N HL CC	RS, WLPCT, CC												
7360	6027							4 ML	0	12	0	0	12	376.00	SOUTH	PR	1	1	2 H 24AC	CMC	1	1	76 SE	N HL CC	RS, CC												
6027									0	37	0	0	37	1,160.00																							
7360	6033							4 ML	14	0	0	0	14	350.00	SOUTH	PR	2	3	6 H 3E	WDC	3	1	100 FNW	N SL CC	RS, WLPCT, CC												
7360	6034							4 ML	6	0	0	0	6	150.00	SOUTH	PR	3	4	4 H 3E	WDC	3	1	100 FNW	N HL CC	RS, WLPCT, CC												
7360	6034							4 ML	7	0	0	0	7	175.00	SOUTH	PR	2	3	3 H 3D	WDC	2	1	100 FNW	N HL CC	RS, WLPCT, CC												
6034									13	0	0	0	13	325.00																							
7360	6035							4 ML	5	6	0	0	11	312.00	SOUTH	PR	3	4	5 H 3E	WDC	3	1	89 FNW	N HL CC	RS, CC												
7360	6035							4 ML	4	0	0	0	4	100.00	SOUTH	PR	3	4	4 H 3E	WDC	3	1	100 FNW	N HL CC	RS, WLPCT, CC												
7360	6035							4 ML	2	13	0	0	15	458.00	SOUTH	PR	3	3	4 H 3E	WDC	3	1	82 FNW	N RS CC	RS, CC												
7360	6035							4 ML	0	14	0	0	14	439.00	SOUTH	PR	2	2	3 H 24D	CMC	1	1	75 SE	N RS CC	PB, PLANT(RC&YC), SS, CC												
6035									11	33	0	0	44	1,309.00																							
7360	6036							4 ML	16	6	0	0	22	587.00	SOUTH	PR	2	2	3 H 3D	WDC	2	1	100 FNW	N HL CC	RS, WLPCT, CC												

VCU	T#	ST	EI	VI	RN	D	U	L	RL	V	L	C4	C5	C6	C7	TOTAL	VOLUME	MMBF	ASPECT	VQO	P	MIN	MAX	ELEV	NO	DW	T	WH	IR	SMU	CODE	ECO	I	M	SN	I	R	M	LE	PH	AA	OT	RT	AE	HM	PROPOSED	FUTURE MANAGEMENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
7360	6037	4	TP	23	0	0	0	0	23	574.00	SOUTH	PR	2	3	6	H	75D	WHS	2	4	85	FNW	N	RS	CC	RS,WLPCT,CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
7360	6038	4	ML	0	10	0	0	0	10	314.00	SOUTH	PR	2	11	12	H	86CD	NME	1	1	93	SEC	N	RS	CC	RS,CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
7360	6038	4	ML	0	12	0	0	0	12	376.00	SOUTH	PR	3	10	11	H	3E	WDC	3	1	100	FNW	N	RS	CC	RS,TMPCT,CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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H	AU	RN	VI	EI	ST	T#	VVCU	L RL	U EU	D VD	V L	V O	V L	V O	C5	C6	C7	TOTAL	VOLUME	MMBF	ASPECT	VQO	E	P	MIN	MAX	T	WH	IR	S	L	O	I	R	I	M	HM	PH	LE	AE	RT	AA	OT	RB	GH	VH	PROPOSED	FUTURE	MANAGEMENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
7370	7030							4 TP	4	7	0	0	0	0	11	320.00		WEST	MO	2	12	15	M	5500	CCD	3	1	70	FW	N	HL	CC	CC	RS,CC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

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H	AU	RN	VI	EI	ST	T#	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

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VCU	T#	L	RL	U	EU	D	VD	C4	V	O	L	C5	V	O	L	C6	V	O	L	C7	TOTAL	VOLUME	MMBF	ASPECT	V00	E	P	O	L	S	T	W	H	I	R	M	HM	AE	RT	VH	PROPOSED	FUTURE MANAGEMENT														
7350	5536	3	ML	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	385.00	NORTH	PR	2	15	30	M	25	CMM	1	3	64	SEC	N	HE	SW	FH,RS,R&W,2-SW																		
7360	6002	4	ML	9	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	633.00	NORTH	PR	2	3	5	H	3D	WDC	2	1	89	FNW	N	HL	CC	RS,CC																		
7360	6002	4	ML	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	183.00	NORTH	PR	2	2	2	H	3D	WDC	2	1	100	FNW	N	HL	CC	RS,TMPCT,CC																		
7360	6002	4	ML	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	263.00	NORTH	PR	2	2	3	H	3D	WDC	2	1	100	FNW	N	HL	CC	RS,TMPCT,CC																		
7360	6002	4	ML	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	182.00	NORTH	PR	2	2	3	H	3D	WDC	2	1	100	FNW	N	HL	CC	RS,TMPCT,CC																		
6002				19	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	1,261.00																																		
7360	6003	4	ML	0	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	1,411.00	EAST	PR	3	9	20	M	4E	CCD	3	1	74	FW	N	HE	SW	FH,RS,R&W,2-SW																		
7360	6003	4	ML	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	847.00	EAST	PR	3	12	15	M	4E	CCD	3	1	70	FW	N	HE	SW	FH,RS,R&W,2-SW																		
6003				0	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	2,258.00																																		
7360	6007	4	TP	26	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	1,339.00	SOUTH	MO	3	10	20	M	18D	CCD	3	3	72	FW	N	HE	SW	FH,RS,R&W,2-SW																		
7360	6008	4	TP	2	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	488.00	SOUTH	MO	1	3	4	H	19C	WHC	2	1	65	FW	N	HL	CC	RS,WLPCT,CC																		
7360	6008	4	TP	18	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	545.00	SOUTH	MO	1	4	4	H	19C	WHC	2	1	57	FW	N	HL	CC	RS,WLPCT,CC																		
7360	6008	4	TP	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	408.00	SOUTH	MO	1	3	3	H	91C	CMC	1	1	50	FW	N	HL	CC	RS,CC																		
7360	6008	4	TP	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	250.00	SOUTH	MO	1	4	4	H	20C	CMB	1	1	54	FW	N	HL	CC	RS,CC																		
7360	6008	4	TP	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	356.00	SOUTH	MO	1	4	5	H	20C	CMB	1	1	55	FW	N	HL	CC	RS,CC																		
6008				43	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74	2,047.00																																		
7360	6011	4	TP	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	95.00	WEST	MM	4	4	6	H	6	CCS	2	5	85	FNW	N	HE	CC	RS,WLPCT,CT,CT,SW																		
7360	6011	4	TP	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	312.00	WEST	MM	4	4	6	H	6	CCS	2	5	85	FNW	N	HE	CC	RS,WLPCT,CT,CT,SW																		
7360	6011	4	TP	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	75.00	WEST	MM	4	4	4	H	6	CCS	2	5	85	FNW	N	HE	CC	RS,WLPCT,CT,CT,SW																		
7360	6011	4	TP	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	187.00	WEST	MM	4	4	6	H	6	CCS	2	5	85	FNW	N	HE	CC	RS,WLPCT,CT,CT,SW																		
7360	6011	4	TP	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	188.00	WEST	MM	2	6	H	33D	CCS	3	4	75	FIW	N	HE	CC	RS,WLPCT,CT,CT,SW																			
7360	6011	4	TP	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	157.00	WEST	MM	2	5	6	H	33D	CCS	3	4	75	FIW	N	HE	CC	RS,WLPCT,CT,CT,SW																		
7360	6011	4	TP	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	182.00	WEST	MM	4	6	6	H	6	CCS	2	5	85	FNW	N	HE	CC	RS,WLPCT,CT,CT,SW																		
7360	6011	4	TP	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	187.00	WEST	MM	4	4	5	H	6	CCS	2	5	85	FNW	N	HE	CC	RS,WLPCT,CT,CT,SW																		
6011				24	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	1,383.00																																		
7360	6017	4	ML	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	63.00	WEST	MM	4	10	10	H	19E	WHC	3	1	92	FW	N	RS	CC	RS,CC																		
7360	6017	4	ML	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	263.00	WEST	MM	4	10	10	H	19E	WHC	3	1	92	FW	N	RS	CC	RS,CC																		
7360	6017	4	ML	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	408.00	WEST	MM	4	10	11	H	54F	WHM	3	1	100	FNW	N	RS	CC	RS,TMPCT,CC																		
6017				3	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	734.00																																		

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VCU	T#	L	U	D	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
ST	VI	EI	RN	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
ASPECT	QO	E	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
MMBF	VOLUME	C4	C5	C6	C7	ACRES	TOTAL	MMBF	ASPECT	QO	E	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P	MIN	MAX	ELEV	NO	DW	IR	WH	T	S	L	O	P

VCU	T#	ST	EI	VI	RN	S										T				I										R				PROPOSED				FUTURE MANAGEMENT			
						L		O		P		VQO		ASPECT		VOLUME		MMBF		MIN		MAX		NO		WH		SN		ID		PH		LE		AE		HM			
						RL	EU	L	C4	C5	C6	C7	ACRES	TOTAL	MMBF	ASPECT	VQO	E	ELEV	DW	SMU	CODE	ECO	M	C	G	EX	HAB	WET	AA	OT	RT	AE	HM							
7360	6029	4	ML	12	7	0	0	0	19	572.00	SOUTH	PR	2	4	6	H	75D	WHS	2	4	85	FNW	N	RS	CC	RS	WL	PCT	CC												
7360	6029	4	TP	23	0	0	0	0	23	574.00	SOUTH	PR	2	3	6	H	75D	WHS	2	4	85	FNW	N	RS	CC	RS	WL	PCT	CC												
6029				35	7	0	0	0	42	1,146.00																															
7360	6030	4	TP	14	0	0	0	0	14	350.00	SOUTH	MO	1	12	15	M	28	CCS	1	1	76	FNW	N	RS	CC	PLANT	(YC),SS,CT,SW														
7360	6030	4	TP	42	0	0	0	0	42	1,048.00	SOUTH	MO	1	8	15	M	28	CCS	1	1	80	FNW	N	SL	CC	RS	TM	PCT	CC												
6030				56	0	0	0	0	56	1,398.00																															
7360	6031	4	TP	27	0	0	0	0	27	674.00	EAST	MO	1	12	15	M	28	CCS	1	1	80	FNW	N	RS	CC	PLANT	(YC),SS,CT,SW														
7360	6031	4	TP	0	32	0	0	0	32	1,003.00	EAST	MO	1	8	15	M	28	CCS	1	1	80	FNW	N	SL	CC	RS	TM	PCT	CC												
7360	6031	4	TP	16	24	0	0	0	40	1,152.00	EAST	MO	1	10	15	M	28	CCS	1	1	80	FNW	N	SL	CC	PLANT	(YC),SS,CT,SW														
7360	6031	4	TP	28	0	0	0	0	28	700.00	EAST	MO	2	12	15	M	18D	CCD	3	1	73	FW	N	SL	CC	PLANT	(YC),SS,CT,SW														
6031				71	56	0	0	0	127	3,529.00																															
7360	6032	4	TP	0	9	0	0	0	9	283.00	SOUTH	MM	1	5	6	H	20C	CMB	1	1	55	FW	N	HL	CC	RS	CC														
7360	6032	4	TP	13	9	0	0	0	22	607.00	SOUTH	MM	1	4	5	H	20C	CMB	1	2	70	FW	N	HL	CC	RS	CC														
7360	6032	4	TP	0	34	0	0	0	34	1,066.00	SOUTH	MM	2	5	7	H	28	CCS	1	4	84	FNW	N	HL	CC	RS	WL	PCT	CC												
6032				13	52	0	0	0	65	1,956.00																															
7360	6513	4	TP	4	6	0	0	0	10	288.00	NORTH	MO	2	15	15	M	4D	CMB	2	1	80	FW	N	HL	CC	PLANT	(YC),SS,CT,SW														
7360	6513	4	TP	1	7	0	0	0	8	245.00	NORTH	MO	3	12	15	H	1E	WDC	3	1	1	00	FNW	N	HL	CC	RS	TM	PCT	CC											
7360	6513	4	TP	0	3	0	0	0	3	95.00	NORTH	MO	3	15	15	H	1E	WDC	3	1	1	00	FNW	N	HL	CC	RS	TM	PCT	CC											
6513				5	16	0	0	0	21	628.00																															
7370	7009	4	ML	0	7	0	0	0	7	220.00	SOUTH	PR	3	2	2	H	6	CCS	2	4	85	FNW	N	HE	CC	RS	WL	PCT	CT,CT,SW												
7370	7009	4	TP	0	16	0	0	0	16	502.00	SOUTH	PR	4	2	3	H	6	CCS	2	5	85	FNW	N	HE	CC	RS	WL	PCT	CT,CT,SW												
7370	7009	4	ML	0	22	0	0	0	22	690.00	SOUTH	PR	3	2	3	H	75D	WHS	2	4	85	FNW	N	HE	CC	RS	WL	PCT	CC												
7009				0	45	0	0	0	45	1,412.00																															
7370	7020	4	ML	5	2	0	0	0	7	187.00	WEST	PR	3	20	20	H	1E	WDC	3	1	1	00	FNW	N	HL	CC	RS	CC													
7370	7020	4	TP	11	0	0	0	0	11	275.00	WEST	PR	3	15	20	H	19E	WDC	3	1	81	FW	N	HL	CC	RS	CC														
7020				16	2	0	0	0	18	462.00																															
7370	7040	4	TP	0	23	9	0	0	32	1,091.00	EAST	PR	2	3	7	H	3E	WDC	3	1	83	FNW	N	RS	CC	RS	R&W	CC													

SILVICULTURE DIAGNOSIS - ALTERNATIVE #6

SILVICULTURE DIAGNOSIS - ALTERNATIVE #6																									PAGE 8 OF 18														
H	AU	RN	VI	EI	ST	T#	VCU	L RL	U EU	D VD	V L	V L	V L	V L	C4	C5	C6	C7	ACRES	TOTAL	VOLUME	MMBF	ASPECT	V00	E	P	MIN	MAX	T	WH	I	R	M	HM	AE	RT	PROPOSED	FUTURE	MANAGEMENT
7370	7041	4	TP	0	14	2	0	16	521.00	EAST	MO	4	3	5	H	528F	WHS	3	4	85	FNW	N	RS	CC	RS,TMPCT,CC														
7370	7041	4	ML	0	10	0	0	10	314.00	EAST	MO	3	3	3	H	75E	WHS	2	4	85	FNW	N	HL	CC	RS,TMPCT,CC														
7041				0	24	2	0	26	835.00																														
7370	7042	4	ML	0	38	0	0	38	1,191.00	SOUTH	MM	2	2	4	H	18C	CCD	2	3	83	FW	N	SL	CC	RS,R&W,CC														
7370	7042	4	ML	0	16	0	0	16	502.00	SOUTH	MM	1	2	4	H	18C	CCD	2	1	80	FW	N	HL	CC	RS,CC														
7370	7042	4	TP	0	16	0	0	16	502.00	SOUTH	MM	1	3	4	H	18C	CCD	2	1	80	FW	N	HL	CC	RS,CC														
7042				0	70	0	0	70	2,195.00																														
7360	7043	4	ML	20	1	0	0	21	531.00	WEST	PR	2	5	6	H	3E	WDC	3	1	83	FNW	N	LS	CC	RS,R&W,CC														
7370	7043	4	ML	10	0	0	0	10	250.00	WEST	PR	2	4	5	H	3D	WDC	2	1	91	FNW	N	RS	CC	RS,R&W,CC														
7370	7043	4	ML	4	0	0	0	4	100.00	WEST	PR	3	5	5	H	3E	WDC	3	1	100	FNW	N	HL	CC	RS,WLPCT,CC														
7370	7043	4	ML	4	0	0	0	4	100.00	WEST	PR	3	5	5	H	3E	WDC	3	1	100	FNW	N	HL	CC	RS,WLPCT,CC														
7370	7043	4	ML	9	0	0	0	9	224.00	WEST	PR	3	4	5	H	3E	WDC	3	1	87	FNW	N	RS	CC	RS,R&W,CC														
7043				47	1	0	0	48	1,205.00																														
7370	7044	4	ML	8	1	0	0	9	232.00	EAST	MM	2	9	9	H	4D	CMB	2	1	70	FW	N	HL	CC	RS,CC														
7370	7044	4	TP	27	0	0	0	27	674.00	EAST	MM	3	5	8	H	3E	WDC	3	1	93	FNW	N	RS	CC	RS,R&W,CC														
7044				35	1	0	0	36	906.00																														
7370	7045	4	TP	9	6	0	0	15	413.00	SOUTH	MM	2	5	6	H	18C	CCD	2	1	92	FW	N	HL	CC	PB,PLANT(RC&YC),SS,CC														
7390	7045	3	TP	7	3	0	0	10	270.00	SOUTH	MM	2	5	6	H	18D	CCD	3	1	86	FW	N	HL	CC	PB,PLANT(RC&YC),SS,CC														
7045				16	9	0	0	25	683.00																														
7370	7046	4	TP	6	5	0	0	11	307.00	NORTH	PR	2	4	5	H	2D	WDC	2	1	100	FNW	N	RS	CC	RS,TMPCT,CC														
7370	7046	4	TP	6	1	0	0	7	182.00	NORTH	PR	2	4	5	H	2D	WDC	2	1	100	FNW	N	RS	CC	RS,TMPCT,CC														
7370	7046	4	TP	8	0	0	0	8	200.00	NORTH	PR	2	5	5	H	11D	WHM	2	1	100	FNW	N	RS	CC	RS,TMPCT,CC														
7370	7046	4	TP	3	0	0	0	3	75.00	NORTH	PR	1	4	4	H	24AC	CMC	1	1	60	SE	N	HL	CC	RS,CC														
7370	7046	4	ML	0	6	0	0	6	188.00	NORTH	PR	1	4	4	H	11D	WHM	2	1	76	FNW	N	HL	CC	RS,CC														
7046				23	12	0	0	35	952.00																														
7370	7047	4	TP	0	8	0	0	8	251.00	EAST	MM	1	5	6	H	24AC	CMC	1	1	60	SE	N	HL	CC	RS,CC														
7370	7047	4	TP	0	6	0	0	6	188.00	EAST	MM	1	5	5	H	25	CMH	1	1	45	SEC	N	HL	CC	RS,CC														
7370	7047	4	TP	0	7	0	0	7	220.00	EAST	MM	4	5	5	H	29EF	WHC	1	5	65	FNW	N	HL	CC	RS,TMPCT,CC														
7370	7047	4	TP	0	6	0	0	6	188.00	EAST	MM	2	4	5	H	2D	WDC	2	1	100	FNW	N	HL	CC	RS,TMPCT,CC														
7370	7047	4	TP	0	6	0	0	6	188.00	EAST	MM	2	5	5	H	2D	WDC	2	1	100	FNW	N	HL	CC	RS,TMPCT,CC														
7370	7047	4	TP	0	17	0	0	17	534.00	EAST	MM	2	3	4	H	2D	WDC	2	2	75	FNW	N	HL	CC	RS,CC														
7047				0	50	0	0	50	1,569.00																														

AU		RN		VI		EI		ST		T#		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V	
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STILLVICTURE DIAGNOSIS - ALTERNATIVE #6

[illegible]

VCU	T#	ST	EI	RN	AU	-----										VOLUME	MMBF	ASPECT	S										T										I										R										PROPOSED									
						L RL	L EU	L D	V C4	V L	V C5	V L	V C6	V L	V C7				TOTAL	C7	ACRES	P	O	L	S	WH	IR	MAX	NO	SMU	CODE	ECO	I	G	M	C	M	ID	SN	SE	N	HL	CC	RS	CC	AE	RT	VH	FH	GH	RH	IM	HM	PH	LE	M	I	R										
																																																											7380	8045	4	TP	10	0	0	0	0	0
7380	8051	4	ML	19	0	7	0	26	761.00	WEST	MO	3	15	20	M	18E	CCD	4	1	79	FW	N	SL	CC	RS	R&W	CC																																									
7380	8051	4	ML	7	0	14	0	21	749.00	WEST	MO	3	15	20	M	18E	CCD	4	1	76	FW	N	SL	CC	RS	R&W	CC																																									
																														8051	26	0	21	0	47	1,510.00																																
7380	8056	4	ML	15	0	0	0	15	375.00	WEST	PR	2	3	5	H	4D	CMB	2	1	70	FW	N	HL	CC	RS	CC																																										
7380	8056	4	ML	12	0	0	0	12	299.00	WEST	PR	3	2	3	H	3E	WDC	3	1	00	FNW	N	HL	CC	RS	WL	PCT	CC																																								
7380	8056	4	ML	37	0	0	0	37	924.00	WEST	PR	1	3	5	H	24AC	CMC	1	1	65	SE	N	HL	CC	RS	CC																																										
																														8056	64	0	0	0	64	1,598.00																																
7380	8057	4	TP	11	0	0	0	11	275.00	SOUTH	PR	2	4	4	H	24AC	CMC	1	1	67	SE	N	HL	CC	RS	CC																																										
7380	8057	4	TP	10	0	0	0	10	250.00	SOUTH	PR	2	3	4	H	4D	CMB	2	1	68	FW	N	HL	CC	RS	CC																																										
7380	8057	4	TP	12	0	0	0	12	299.00	SOUTH	PR	2	2	3	H	24AC	CMC	1	1	65	SE	N	HL	CC	RS	CC																																										
7380	8057	4	TP	15	0	0	0	15	375.00	SOUTH	PR	2	3	4	H	18C	CCD	2	1	74	FW	N	HL	CC	RS	CC																																										
7380	8057	4	TP	9	0	0	0	9	224.00	SOUTH	PR	2	3	4	H	4D	CMB	2	1	67	FW	N	HL	CC	RS	CC																																										
7380	8057	4	TP	13	0	0	0	13	325.00	SOUTH	PR	1	2	3	H	4D	CMB	2	1	65	FW	N	HL	CC	RS	CC																																										
7380	8057	4	TP	6	0	0	0	6	150.00	SOUTH	PR	2	4	4	H	4D	CMB	2	1	70	FW	N	HL	CC	RS	CC																																										
																														8057	76	0	0	0	76	1,898.00																																
7380	8058	4	TP	4	0	0	0	4	100.00	NORTH	PR	1	2	2	H	24AC	CMC	1	1	60	SE	N	HL	CC	RS	CC																																										
7380	8058	4	TP	11	0	0	0	11	275.00	NORTH	PR	1	2	3	H	4C	CMB	2	1	70	FW	N	HL	CC	RS	CC																																										
																														8058	15	0	0	0	15	375.00																																
7380	8060	4	ML	0	15	0	0	15	471.00	NORTH	MO	3	15	20	H	3E	WDC	3	1	00	FNW	N	RS	CC	RS	CC																																										
7380	8060	4	ML	0	21	0	0	21	659.00	NORTH	MO	3	15	20	H	3E	WDC	3	1	91	FNW	N	RS	CC	RS	CC																																										
																														8060	0	36	0	0	36	1,130.00																																
7380	8063	4	TP	0	0	24	0	24	985.00	SOUTH	PR	3	4	7	H	74E	WHM	2	3	93	FNW	N	RS	CC	RS	R&W	CC																																									
7380	8063	4	TP	0	0	23	0	23	944.00	SOUTH	PR	3	5	6	H	528E	WHS	3	3	89	FNW	N	HL	CC	RS	CC																																										
																														8063	0	0	47	0	47	1,929.00																																
7380	8064	4	TP	0	7	20	0	27	1,041.00	SOUTH	PR	4	9	15	H	528F	WHS	3	4	85	FNW	N	RS	CC	RS	IMPCT	CC																																									
7380	8064	4	TP	0	6	7	0	13	475.00	SOUTH	PR	3	6	8	H	528E	WHS	3	4	85	FNW	N	RS	CC	RS	WL	PCT	CC																																								
7380	8064	4	TP	0	12	1	0	13	417.00	SOUTH	PR	3	2	8	H	528F	WHS	3	4	87	FNW	N	RS	CC	RS	WL	PCT	CC																																								
																														8064	0	25	28	0	53	1,933.00																																

NORTH REVILLA FINAL EIS - APPENDIX H

[illegible]

AU		RN		VI		EI		ST		T#		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V		V			
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Appendix I

Sale Area Improvements/KV Opportunities

Ketchikan Area

Ketchikan Pulp Company Long-Term Sale

North Revilla Project Area

Recommended Sale Area Improvement Projects

I. ESSENTIAL REFORESTATION

A. Natural Regeneration Surveys

Objective/Justification: Monitor the occurrence of natural regeneration stocking following timber harvest. The National Forest Management Act of 1976 states that "It is the policy of Congress that all forested lands in the National Forest system shall be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and condition of stand designed to secure the maximum benefits of multiple use sustained yield management in accordance with land management plans".

Treatment: Stocking surveys shall be conducted three growing seasons following harvest to assure that satisfactory levels of natural stocking have been achieved as prescribed in the stocking level guides, Chapter 9, FSH 2409.17. The reporting and record keeping required to track and monitor the harvesting, regeneration, certification process is included in the regeneration survey costs.

Needs/Cost: Conduct natural regeneration stocking surveys at a direct cost of \$8.50/acre. See the enclosed detailed listing of stands in need of surveys by alternative.

$$\$8.50/\text{acre} \times 1.04^5 (1.22) = 10.37 \times 1.3798(\text{OH}) = \$14.31/\text{acre}$$

Work Summary:Regeneration
Surveys

Alternative #2	\$14.31 acre	7,876 acres	\$112,706 cost
Alternative #3	\$14.31 acre	5,239 acres	\$ 74,970 cost
Alternative #4	\$14.31 acre	5,576 acres	\$ 79,973 cost
Alternative #5	\$14.31 acre	5,944 acres	\$ 85,059 cost
Alternative #6	\$14.31 acre	6,115 acres	\$ 87,506 cost

B. Cone Collection

Objective/Justification: Collect an adequate amount of tree seed from the appropriate seed zones to accomplish required artificial regeneration under this plan. All seed will be collected from phenotypically superior trees which exhibit desirable characteristics such as form, height, branch angle, resistance to insects and disease, etc. Ketchikan Area has sufficient spruce seed on hand to meet its spruce planting needs. The Area, however, lacks seed for Alaska and western redcedar planting. Planting roughly 300 acres of cedar (western redcedar and Alaska yellow cedar) in all action alternatives will require (300 AC X 300 TPA) 90,000 seedlings. Approximately 40,000 seedlings can be produced per pound of clean seed. Therefore 2.25 pounds of clean seed or 11 bushels (5 bushels/lb seed) of cones must be collected.

Treatment: Cone collections will occur in moderate or good cone collecting years based on field surveys. Collections will be done by force account crews in the fall after the cones have matured. Collection will involve identifying phenotypically superior trees, felling the tree, picking and bagging the cones, tagging the bags and transporting the cones to Petersburg where the seed will be cleaned and stored until needed. Seed collections will be stratified by seed zones to make sure the planting stock is adapted to location where it will be planted.

Needs/Cost: Collect 11 bushels of seed from the appropriate seed zones at a direct cost of \$190.40/bushel.

$$\$190.40/\text{Bul} \times 1.04^2 (1.08) = \$205.63 \times 1.3798(\text{OH}) = \$283.73/\text{Bul}$$

Work Summary:

Cone
Collection

All Action			
Alternatives	\$284/bushel	11 bushels	\$ 3,124 cost

C. Planting

Objective/Justification: Planting will occur only on those sites where natural regeneration will not result in a fully stocked stand of desirable species within 5 years after harvest as required under the National Forest Management Act of 1976.

The requirements and guidelines for minimum acceptable stocking are listed in FSH 2409.17 Silvicultural Practices Handbook. Appendix A displays the harvest unit, acres and species to be planted on a site specific basis.

The sites to be planted fall under three general categories:

1. Floodplains and Alluvial Fans - These areas usually have deep well drained soils with poorly developed horizons due to periodic flooding. Mature stands rarely support more than 100-150 stems per acre. Species composition is primarily spruce growing on raised hummocks. Perturbation results in heavy brush (alder, salmonberry, and devils club) competition that will delay natural regeneration and suppress tree growth for a period of 20 to 50 years following harvest. The vast majority of the Tonowek and Tuxekan soil series have been excluded from harvesting in recent years, but small inclusions will be treated in this operating period. These sites will be planted with Sitka spruce.
2. Dense Brush or Inadequate Seed Source - Sparsely stocked sites with an established ground cover of dense vegetation such as salmonberry or devils club will retard stocking and growth for at least 20 years. Sites lacking a satisfactory seed source, including high elevation sites, sites adjacent to muskegs or lakes and immature stands where natural regeneration cannot be assured or even reasonably expected within 5 years after harvest. These sites will be planted with Sitka spruce.
3. Somewhat Poorly Drained to Poorly Drained Soils, Low Productivity Cedar Sites - These sites currently support decadent, low-quality sawtimber with cedar making up at least 10 percent of the canopy. Getting natural cedar regeneration on these sites is unlikely because:
 - a. Cedar has limited capabilities to disperse seed over long distances from the parent tree. Alaska-cedar seed dispersion is limited to 300-400 feet.
 - b. Alaska cedar is not a prolific seed producer. Cone crops are infrequent and germination rates are low.
 - c. Unlike "down-south" cedar, southeast Alaska cedar display a greater degree of intolerance to shade. Local cedar is unable to regenerate under its own canopy and advance cedar reproduction is generally absent on the forest floor.

- d. Low-volume cedar stands often result in heavy slash accumulation which can inhibit natural reproduction. Prescribed burning may be required to lower slash levels for planting ease.

Therefore, planting of western redcedar and/or Alaska-cedar to improve productivity and maintain tree species diversity, shall be addressed in the silvicultural prescription for cedar stands. "Relationship of Forest Plant Association to Soils Series...Ketchikan Area" tables, which are found in the back of Preliminary Forest Plant Association Management Guide, Ketchikan Area, was used to identify potential sites.

Treatment: Floodplains/alluvial fans and dense shrub/inadequate seed source planting areas will be planted with 1-0 Sitka spruce stock. The low productivity/Cedar sites will be planted with 1-0 western redcedar or Alaska-cedar as specified in Appendix A. Generally a mixture of western redcedar and Alaska yellow cedar will be planted on sites below 800 feet in elevation on North and East Aspects, and below 1000 feet on South and West aspects. Cedar sites with elevations above those listed have been scheduled for Alaska yellow cedar planting only.

Needs/Cost: The direct cost of planting is \$330.00 per acre. See enclosed detailed listing of stands requiring treatment/alternative.

$$\$330.00/\text{acre} \times 1.04^3 (1.13) = \$372.90 \times 1.3798(\text{OH}) = \$514.53/\text{acre}$$

Work Summary:

Planting

Alternative #2	\$515/acre	356 acres	\$183,340 cost
Alternative #3	\$515/acre	495 acres	\$254,952 cost
Alternative #4	\$515/acre	344 acres	\$177,160 cost
Alternative #5	\$515/acre	480 acres	\$247,200 cost
Alternative #6	\$515/acre	453 acres	\$233,295 cost

D. Plantation Survival Surveys

Objective/Justification: Monitor the survival and condition of planted trees one and three growing seasons following planting and certify that minimum stocking levels are achieved per NFMA.

Treatment: Establish and survey plantation survival stake rows the first and third growing seasons following planting. The third year survey will also determine the overall stocking, both planted and established natural regeneration.

Needs/Cost: First and third year survival surveys will be required at a direct cost of \$14.00 per acre. See enclosed detailed listing of stands needing surveys by alternative.

$$\$14.00/\text{acre} \times 1.04^4 (1.17) = \$12.43 \times 1.3798(\text{OH}) = \$22.60/\text{acre}$$

Work Summary:

Plantation Survival Surveys

Alternative #2	\$23/acre	356 acres	\$ 8,188 cost
Alternative #3	\$23/acre	495 acres	\$11,385 cost
Alternative #4	\$23/acre	344 acres	\$ 7,912 cost
Alternative #5	\$23/acre	480 acres	\$11,040 cost
Alternative #6	\$23/acre	453 acres	\$10,419 cost

E. Site Preparation

Objective/Justification: Prescribed burning for site preparation has limited application in Southeast Alaska. Incidences where prescribed burning is a useful silvicultural tool is:

1. When planting is prescribed and slash levels, particularly in cedar stands, must be reduced to clear planting spots and provide planting crew access onto the planting site.
2. When removal of advance hemlock regeneration or hemlock residuals is desirable because they are infected with dwarf mistletoe, or hemlock fluting is a concern and it would be prudent to convert the stand to mostly spruce.

Treatment: Prior to implementing a prescribed burn a silvicultural prescription, verified by an on-site visit (prior to harvest and after the unit is harvested) will be prepared by a certified silviculturist. A prescribed burning plan, which contains a fuels analysis, a certified burning prescription designed to meet the specified objectives, etc., will be prepared prior to burning. Specified harvest units will be prescribe burned within 3 years following harvest.

Prescribed burning for natural regeneration is not recommended until more is learned about natural regeneration and burning. Past experience has shown that minimum stocking levels may not be achieved within 5 years through natural regeneration alone. Planting shall follow prescribed burning treatments.

Needs/Cost: Prescribed burning prior to planting of western red cedar or Alaska-cedar Direct cost estimate is \$110.00 per acre. See enclosed detailed listing of potential prescribed burning acres.

From previous prescribed-burning programs, $\$110.00/\text{acre} \times 1.04^2$
 $(1.08) = \$118.80 \times 1.3798(\text{OH}) = \$163.93/\text{acre}$

Work Summary:

Prescribe Burning

Alternative #2	\$164/acre	154 acres	\$25,256 cost
Alternative #3	\$164/acre	160 acres	\$26,240 cost
Alternative #4	\$164/acre	139 acres	\$22,796 cost
Alternative #5	\$164/acre	142 acres	\$23,288 cost
Alternative #6	\$164/acre	125 acres	\$20,500 cost

F. Release and Weed

Objective/Justification: Remove high numbers of poor form or diseased submerchantable hemlock whips.

Soil prescriptions for units call for partial suspension on high mass movement index MMI = 3 soils during yarding operations (very high mass movement index MMI=4 soils are no longer considered suitable). In some cases, many undesirable residuals remain standing following partial or full suspension yarding. Hemlock residuals diseased with mistletoe can reinfect the new regeneration if they are allowed to remain in the stand. Residuals are often of poor form, may contain heart rot, or are damaged during logging and therefore, rarely contribute to the volume of the new stand. When in great numbers, residuals will compete for growing space and can result in a loss in volume at the end of the next rotation.

Region 10 has no contractual requirement for the logger to sever residual trees. Removing hemlock residuals in a precommercial thinning treatment has not been all that successful because of widely fluctuating funding and targets.

Treatment: Sever the hemlock residuals following harvest. As a rule, about 20 percent of the acres, which require partial or full suspension, will need residuals severed. Treatment of less than 2 acres per site was not considered economically feasible and was therefore not scheduled.

Stands likely needing release and weeding are listed by alternative.

Needs/Cost: Hemlock residuals will require severing of mistletoe infected stems at a direct cost of \$121.12 per acre.

$$\$121.12/\text{ac.} \times 1.4^3 (1.13) = 136.87 \times 1.3798(\text{OH}) = \$188.85$$

Work Summary:

Release

Alternative #2	\$189/acre	457 acres	\$ 86,373 cost
Alternative #3	\$189/acre	304 acres	\$ 57,456 cost
Alternative #4	\$189/acre	335 acres	\$ 63,315 cost
Alternative #5	\$189/acre	358 acres	\$ 67,662 cost
Alternative #6	\$189/acre	358 acres	\$ 67,662 cost

II. MITIGATION

A. Debris Slides Stabilization and Rehabilitation and Debris Slide Rehabilitation Monitoring

Objective/Justification: Stabilize and rehabilitate harvest-activity initiated landslides within units and along roads which are no longer the responsibility of the purchaser to treat.

Approximately one debris slide, 5 acres or larger, occurs for every 2,240 harvested acres Tongass wide (DEIS Tongass Land Management Plan Revision, June 1990). If slides smaller than 5 acres are included, than the number of debris slides occurring for every 2,240 harvested acres would increase one and one half fold. Average size of slides on the Ketchikan Area are 5 acres (Loggy 1974).

The majority of these slides normally occur within a 5 to 10 year period after cutting or roading from the following combined impacts:

1. Over steepen side slopes,
2. Storms with high wind and /or intensive rain fall, and
3. Where roots of severed trees have lost their holding strength in 3 to 5 years.

Approximately 5,769 to 8,585 acres are proposed for harvest this period. This would equate to 2.6 to 3.8 natural slides or 4 to 6 slides with harvest. At 5 acres per slide this would equate to 20 - 30 acres of soil disturbance that would need stabilizing and rehabilitation.

Treatment: Slides that have occurred will be rehabilitated with introduced grasses and/or herbaceous vegetation. Follow up monitoring will be done for two (2) years after initial rehabilitation to insure stabilization has been accomplished.

The treatment is to stabilize surface soil erosion to prevent or reduce further sediment introduction into streams and/or lost in soil productivity of the remaining soil on the slide trace.

Needs/Cost: Stabilize 30 acres of landslides at a direct cost of \$1200 per acre. Monitor each stabilized landslide for 2 years after initiation stabilization at \$150 per slide, per year.

$$\$1,200/\text{ac.} \times 1.04^6 (1.27) = 1,524 \times 1.3798(\text{OH}) = \$2,102.82/\text{ac.}$$

$$\$300/\text{ea.} \times 1.04^6 (1.27) = 381 \times 1.3798(\text{OH}) = \$525.70/\text{Slide}$$

Work Summary: All Alternatives use 6 slides and 30 acre estimate.

Slide Rehabilitation	\$2,103/acre	30 acres	\$ 63,090 cost
Monitor stabilized	\$ 526/slide	6 slides	\$ 3,156 cost

B. Soil Stability/Wildlife Seeding of Roads - 50 Acres

Objective/Justification: This project is consistent with Regional and Forest direction to maintain or enhance wildlife habitat capability. The Long-Term Sale FEIS prescribed wildlife seeding as a mitigation measure.

The objective is to increase forage production within and adjacent to harvest units to benefit Sitka Black-tailed Deer, Black Bear, Blue Grouse, Dusky and Vancouver Canada Geese, and successional nongame birds. A secondary objective would be to minimize sedimentation and inhibit alder regrowth.

Treatment: Ketchikan Pulp Co. is responsible for seeding all temporary roads and landings used during the current operating period. However, we anticipate that there will be some seeding failures. Therefore, treatment will include re-seeding of temporary roads, and landings where initial seeding attempts failed; and seeding specified roads, which have been closed to vehicle access. Seed mixture will contain birds-foot Trefoil 12#/ac, Vetch 12#/ac, Panic Grass 8#/ac, Reed Canary Grass 8#/ac, and Alta Fescue 6#/ac, or a mixture of other plants.

System roads designated for closure and wildlife forage seeding are displayed in the North Revilla FEIS under transportation.

Needs/Costs: The direct cost for hand seeding is \$300 per acre. $\$300/\text{acre} \times 1.04^2 (1.08) = \$324/\text{acre} \times 1.3798(\text{OH}) = \$447/\text{acre}$

Approximately 50 acres will be treated under all of the action alternatives

Work Summary:

Wildlife Seeding	\$447/acre	50 acres	\$22,350 cost
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III. MAINTENANCE

A. Precommercial Thinning for Wildlife & Fisheries

Objective/Justification: This project is consistent with Regional and Forest direction to maintain wildlife habitat capability. The North Revilla DEIS prescribed precommercial thinning of stands as a mitigation measure.

Precommercial thinning will delay crown closure and ultimately will prolong the existence of understory vegetation. Normal precommercial thinning to a 12'x12' spacing will delay crown closure and eventual loss of understory to approximately stand age of 35-40 years. Crown closure in unthinned stands occurs about stand age of 20 years. The objective of "wildlife thinning" is to delay crown closure even for longer periods by thinning to wider spacings of up to 16x16 feet. Complete crown closure does not occur for 16x16 foot spacing until approximately 50 years of stand age (SI = 110 for 100 yr.).

The forage is intended to benefit Sitka Black-tailed Deer and Black Bear, with secondary benefits to Timber Wolves, Pine Marten, and successional bird species. Long-term benefits include increased windfirmness and the developemnt of larger diameter trees earlier in the rotation. A sequence of girdlings could provide large snags by age 70. Extended rotations and density control may be able to provide additional high quality forbs and shrubs for wildlife forage, above that which would be expected of a typical management regime.

Treatment: Second-growth timber release is prescribed for 12-18 year old stands within important deer/bear habitat. Thinning will be done throughout the unit at a spacing of 12x12 feet to 16x16 feet dependent on the species of forage to be released within the second-growth stand. Prescriptions calling for spacings of 16x16 feet or more shall weigh the wildlife benefits against estimated volume loss of 10-12 percent, extended rotation time, and loss of wood quality due to the large limbs.

Residual trees will not be girdled unless the trees are mistletoe infested that will infect the second growth or are of very poor form. Some critical second-growth stands will have 5 percent of the units left unthinned to provide thermal cover for Sitka Black-tailed Deer and Pine Marten.

The southerly and westerly facing candidate stands proposed for wildlife habitat precommercial thinning are listed below.

Needs/Costs: The direct cost of the project is \$340.09 per acre.

$$\$340.09/\text{acre} \times 1.04^5 (1.22) = 414.91 \times 1.3798(\text{OH}) = \$572.49/\text{acre}$$

Work Summary:

Precommercial

Thinning	\$572/acre	1925 acres	\$1,101,100.00cost
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High Priority Stands: (South/West Aspects <800' elevation)

Stand Number	Total Acres	Stand Number	Total Acres
-----	-----	-----	-----
73305 67	12.46	73901 124	106.24
73602 74	37.23	73905 86	25.71
73602 76	100.00	73906 77	34.27

Medium Priority Stands: (South/West Aspects <1500' elevation)

Stand Number	Total Acres	Stand Number	Total Acres
-----	-----	-----	-----
73301 59	106.98	73903 69	54.51
73305 66	125.61	73904 89	27.85
73602 75	159.38	73904 90	53.93
73603 137	44.47	73904 94	111.59
73701 124	70.84	73905 87	91.00
73801 68	36.55	73906 73	21.32
73901 120	55.02	73906 74	81.76
73901 121	66.25	73906 75	103.71
73901 122	118.30	73906 76	33.09
73902 45	247.13		

B. Precommercial Thinning

Objective/Justification: The objectives of precommercial thinning is: (1) Increase timber yields by delaying the occurrence of competition for growing space between fast growing young trees. The site's wood growing potential is distributed over a few trees instead of many. This results in larger diameter steams over a shorter time span. (2) Increase the stand's spruce composition and ultimate yield and value through favoring spruce as future crop trees. (3) Remove the deformed, diseased trees. (4) And, prolong the understory vegetation for wildlife use by delaying crown closure.

Second-growth stands in southeast Alaska suffer from excessive competition for light because of large number of young trees that invade a clearcut. Because hemlock and spruce are shade tolerant, the young stands have low mortality rates and trees do not express strong dominance in the first half of a rotation. Significant natural thinning through competition occurs late in the stand's life. Precommercial thinning will result in larger diameter trees over a shorter time period, increase sawlog yields about 10-12 per cent, and reduce the economic rotation length by 10-20 years.

Treatment: Precommercial Thinning will occur in stands of 15-20 years of age. Crop tree spacing will generally be 12x12 feet but can vary according to the silviculture prescription. Stands planned for treatment are listed below.

Needs/Costs: The direct cost of the project is \$289.68 per acre.

$$\$340.09/\text{ac.} \times 1.04^5 (1.22) = 414.91 \times 1.3798(\text{OH}) = \$572.49/\text{ac.}$$

Work Summary:

Precommercial

Thinning \$572/acre 1,710 acres \$ 978,120.00 cost

Timber PCT Stands: (High/Medium productivity sites 15-20 years old
not scheduled for wildlife thinning.)

Stand Number	Total Acres	Stand Number	Total Acres
-----	-----	-----	-----
73301 61	12.46	73901 125	89.57
73301 62	37.23	73901 128	186.83
73501 39	100.00	73901 129	93.12
73601 48	106.98	73901 131	79.80
73603 127	125.61	73903 67	26.31
73603 130	159.38	73903 68	77.97
73603 131	44.47	73903 70	45.22
73603 132	70.84	73903 71	55.97
73701 126	36.55	73904 91	64.01
73701 127	55.02	73904 92	32.49
73801 71	135.34	73904 93	120.33
73901 123	23.14		

IV. IMPROVEMENT

A. Fish Habitat Enhancement/Monitoring: Margaret Creek Fish Pass (KRD)

Objective/Justification: The KV funded Margaret Creek Fish Pass was constructed in 1989 and started operations in 1990. During the planning process, AGF&G raised concerns around the monitoring of the project. Questions that needed answering were: (1.) What would be the impact to the resident fish with the introduction of salmon into the stream system? (2.) What levels of returning salmon would result from the installation of the fish pass?

These concerns were addressed in the Margaret Creek Fish Pass decision memo, which was signed April 18, 1989. The decision memo stated that: "The Forest Service will be responsible for future monitoring of the resident fish populations, adult salmon returns, and contracting to ADF&G acoustical surveys. ADF&G will establish self sustaining runs of coho and sockeye salmon. A memorandum of understanding (MOU) will be initiated to finalize agency involvement."

To meet the concerns over monitoring, in May 1989, the Forestry Sciences Laboratory began a study of the resident salmonid species in Margaret Lake to establish base line conditions prior to the introduction of sockeye salmon fry into the lake and the completion of the fish ladder. The study was expanded in 1990 to include the distribution of cutthroat trout and Dolly Varden char and their uses of stream habitat in the primary tributary of Margaret Lake and a study of the zooplankton populations that serve as the primary food source for juvenile salmonids in the lake.

With the start up of the fish pass operation in 1990, additional monitoring of the effectiveness of the fish pass began. Monitoring included:

1. Identification of species and numbers of anadromous salmonids moving up the ladder.
2. Determination of the timing and duration of the adult returns.
3. Counting the number of smolt of sockeye and coho leaving the lake/stream system.
4. Determination of the smolt and pink salmon fry survival during migration over the 23 foot falls in lower Margaret Creek.

The results from the monitoring and study will provide the first quantitative evaluation of a fish ladder project and an introduction of sockeye salmon into a lake and their effect on resident salmonid populations. At present, there is no data that identify critical factors which determine the success or failure of fish ladder projects that introduce anadromous salmonids into a non-anadromous lake/stream system. This same project is listed on the 1989-94 Longterm Sale KV Plan. Price fluctuations and effective purchaser credit may result in all or part of the project being unfunded through KV. Yearly updates (as required) will need to make sure that duplicate collections do not occur.

Treatment:

The answers being sought in this project will require a long-term study and monitoring effort. Intensive study will be needed in 1991-92 to provide sound data to which change will be measured against. Items which will be studied and monitored during this period include monthly sampling of cutthroat trout and Dolly Varden for numbers, growth, feeding and age structure; seasonal limnological sampling of zooplankton and phytoplankton populations; and to enumerate adult salmon migration up the fish ladder and beyond into the lake and stream sections of the Margaret system.

Less intensive monitoring will take place during 1993-96 where samples will be gathered on an annual basis or during the migration period. Intensive study and monitoring will resume in 1997 or some year after depending on funding and the results of the ongoing monitoring and study.

A detailed study plan can be obtained through Mason (Buck) Bryant at FSL in Juneau. Planning Record contains: 1. Decision Memo for Margaret Creek Fish Pass; 2. Memorandum of Understanding 91-001; 3. A Proposal for Continuing Studies; 4. Progress Report for 1990; and 5. Cost Estimate.

Needs/Cost: See Planning Record

Work Summary: Project Costs: (inflation and OH is included)

ADF&G	72,000 X 1.22 X 1.3798 (OH)	= 121,200
FORESTRY SCIENCES LAB.	539,200 X 1.13 X 1.3798 (OH)	= 907,670
DISTRICT COSTS	243,700 X 1.13 X 1.3798 (OH)	= 410,230

GRAND TOTAL PROJECT COST = 1,439,100

B. Margaret Creek Fish Pass and Trail Interpretive Sign (KRD)

Objective/Justification: To provide a trailhead sign and an interpretive sign for the Fish Pass Trail to the Margaret Lake fish pass.

In 1989, the Margaret Creek fish steep pass and connecting trail were constructed using K-V funds. July 1990, the fish pass was opened to pink and coho salmon. Sockeye fry were introduced into Margaret Lake starting in 1988 and the first return of adults is expected in 1991. Visits to the fish pass by sports fishing residents of Ketchikan is expected to increase as the runs of returning salmon increase over the next few years. Margaret Creek is about 30 water miles north of Ketchikan. This same project is listed on the 1989-94 Longterm Sale KV Plan. Price fluctuations and effective purchaser credit may result in all or part of the project being unfunded through KV. Yearly updates (as required) will need to make sure that duplicate collections do not occur.

Treatment: One sign will be placed at the trail head. A series of interpretive signs, depicting the life cycles of different salmon species, will be mounted at the fish pass viewing platform.

Needs/Cost: One GS-7 recreation technician for one week and one GS-5 recreation technician for two days to construct interpretive signs and place them on location.

1 hr helicopter @ \$500/hr	\$ 500.00
Personnel	740.00
Interpretive signs and monument	2,000.00
Trailhead sign	<u>300.00</u>
Total cost for 1990 is	\$3,540.00

Expected accomplishment year: 1992.

$\$3,540 \times 1.04^2 (1.08) \times 1.3798(\text{OH}) \$5,275$

Work Summary:

Interpretive Signs \$5,275/Proj	Project	\$5,275 cost
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Cost Breakdown Table

Page 1

Project Name	Personnel - Includes Contract Prep and Administration	Subsistence	Travel - FW, Helicopter, Boat, Vehicle, other	Other - Facilities, Equipment, Contracts, etc.	Rate (Cost/Unit) Total Expenses
<u>I. ESSENTIAL REFORESTATION</u>					
A. Natural Regeneration Surveys (3 & 5 Years)	\$ 4.88/Ac. <u>2/</u>	\$ 0.48	\$ 0.64	\$ 2.50 <u>3/</u>	\$ 8.50/Acre
B. Cone Collection	\$140.40/Bushel	\$ 0.00	\$10.00	\$ 40.00	\$190.40/Bushel
C. Planting	\$ 70.00/Ac.	\$ 0.00	\$50.00 <u>4/</u>	\$210.00 <u>5/</u>	\$330.00/Acre
D. Plantation Survival Surveys (1 & 3 Years)	\$ 8.00/Ac.	\$ 0.48	\$ 4.02	\$ 1.50	\$ 14.00/Acre
E. Site Preparation w/Prescribed Burning	\$ 25.00/Ac.	\$ 0.00	\$60.00 <u>6/</u>	\$ 25.00	\$110.00/Acre
F. Release & Weeding (Dwarf Mistletoe Sanitation)	\$ 50.00/Ac.	\$ 0.00	\$ 0.00	\$ 70.48 (contract)	\$121.00/Acre
<u>II. MITIGATION</u>					
A. Slide Stabilization Plus 2 Year Monitoring	\$200.00/Ac. \$200.00/Slide		(Helicopter) \$850.00 \$ 75.00	(Seed & Fert.) \$150.00 \$ 25.00	\$1,200/Acre \$ 300/Slide
B. Wildlife Road Seeding	\$191.00/Ac.		\$ 19.00	\$ 90.00	\$ 300/Acre

1/ A 15% facilities support charge not included in overhead calculations has been assigned here.

2/ Includes office and field work associated with surveys, plus database updates & record keeping.

3/ The prorated cost of reprocurring aerial photography necessary during the regeneration process & database updates

4/ Includes the cost of personnel travel and transportation of the seedlings.

5/ Includes the cost of the planting contract, seedlings, coolers, and other facilities.

6/ Includes the cost of personnel travel and helicopter use during the firing operation.

Cost Breakdown Table

Page 2

Project Name	Personnel - Includes Contract Prep and Administration	Subsistence	Travel - FW, Helicopter, Boat, Vehicle, other	Other - Facilities, Equipment, Contracts, etc.	Rate (Cost/Unit) Total Expenses
<u>III. MAINTENANCE</u>					
A. Wildlife Habitat Precommercial Thin	\$ 60.00/Ac.	\$ 0.40	\$ 2.65	\$277.40	\$340.09/Acre
B. Forest Health & Prod. Precommercial Thin	\$ 60.00/Ac.	\$ 0.40	\$ 2.65	\$277.40	\$340.09/Acre
<u>IV. IMPROVEMENTS</u>					
A. Margaret Creek Fish Pass	SEE PLANNING RECORD FOR DETAILED COST BREAKDOWN (including Inflation & OH)				
B. Margaret Creek Interpretive Sign	\$740.00/Proj.	\$ 0.00	\$500.00	\$2,300.00	\$3,540.00/Proj.

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

ALTERNATIVE 2

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HU2 UNIT#	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
2001	47	0.00	0.00	0.00	9.40	47
2002	27	20.00	20.00 (RC&YC)	20.00	0.00	7
2003	40	0.00	28.00 (YC)	28.00	8.00	12
2004	30	0.00	0.00	0.00	6.00	30
2005	49	0.00	0.00	0.00	4.00	49
2006	48	0.00	0.00	0.00	0.00	48
2007	4	0.00	0.00	0.00	0.00	4
3001	20	0.00	0.00	0.00	4.00	20
3002	27	0.00	0.00	0.00	5.40	27
3003	106	0.00	0.00	0.00	21.20	106
3004	145	0.00	0.00	0.00	0.00	145
3005	32	0.00	0.00	0.00	0.00	32
3006	119	0.00	0.00	0.00	0.00	119
3007	91	0.00	0.00	0.00	0.00	91
3008	49	0.00	0.00	0.00	9.80	49
3009	24	0.00	0.00	0.00	0.00	24
3010	50	0.00	0.00	0.00	1.40	50
3011	46	0.00	0.00	0.00	7.40	46
3012	64	0.00	0.00	0.00	5.60	64
3013	27	0.00	0.00	0.00	0.00	27
3014	18	0.00	0.00	0.00	0.00	18
3015	27	0.00	0.00	0.00	0.00	27
4002	57	0.00	0.00	0.00	9.60	57
4004	17	0.00	0.00	0.00	0.00	17
5003	13	0.00	0.00	0.00	0.00	13
5004	72	0.00	0.00	0.00	3.00	72
5006	23	0.00	0.00	0.00	0.00	23
5007	46	0.00	0.00	0.00	9.20	46
5008	62	40.00	40.00 (RC&YC)	40.00	0.00	22
5009	24	0.00	0.00	0.00	0.00	24
5010	12	0.00	0.00	0.00	0.00	12
5012	11	0.00	0.00	0.00	0.00	11
5014	50	0.00	0.00	0.00	0.00	50
5015	4	0.00	0.00	0.00	0.00	4
5019	41	0.00	0.00	0.00	0.00	41
5020	13	0.00	0.00	0.00	0.00	13
5021	3	0.00	0.00	0.00	0.00	3
5022	7	0.00	0.00	0.00	0.00	7
5023	101	0.00	0.00	0.00	0.00	101
5028	21	0.00	0.00	0.00	0.00	21

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

ALTERNATIVE 2

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HU2 UNIT#	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
5044	31	0.00	0.00	0.00	6.20	31
5053	14	0.00	0.00	0.00	0.00	14
5501	26	0.00	0.00	0.00	0.00	26
5502	46	0.00	0.00	0.00	0.00	46
5505	34	0.00	0.00	0.00	0.00	34
5513	16	0.00	0.00	0.00	0.00	16
5517	12	0.00	0.00	0.00	0.00	12
5518	44	0.00	0.00	0.00	7.20	44
6001	24	0.00	0.00	0.00	0.00	24
6002	44	0.00	0.00	0.00	0.00	44
6003	72	0.00	0.00	0.00	14.40	72
6004	78	48.00	48.00 (RC&YC)	48.00	12.60	30
6005	24	0.00	0.00	0.00	0.00	24
6006	53	0.00	0.00	0.00	0.00	53
6007	48	0.00	0.00	0.00	9.60	48
6008	74	0.00	0.00	0.00	0.00	74
6009	61	0.00	0.00	0.00	0.00	61
6010	76	0.00	0.00	0.00	10.20	76
6011	49	0.00	0.00	0.00	0.00	49
6012	54	0.00	0.00	0.00	0.00	54
6013	56	0.00	10.00 (YC)	10.00	0.00	46
6014	39	0.00	0.00	0.00	3.00	39
6015	24	0.00	0.00	0.00	0.00	24
6016	30	0.00	0.00	0.00	3.80	30
6017	24	0.00	0.00	0.00	0.00	24
6018	24	0.00	0.00	0.00	0.00	24
6019	22	0.00	0.00	0.00	0.00	22
7001	66	0.00	0.00	0.00	8.20	66
7002	33	0.00	0.00	0.00	0.00	33
7003	37	0.00	0.00	0.00	0.00	37
7004	22	0.00	0.00	0.00	0.00	22
7005	26	0.00	0.00	0.00	0.00	26
7006	32	0.00	0.00	0.00	0.00	32
7007	16	0.00	0.00	0.00	0.00	16
7008	14	0.00	0.00	0.00	0.00	14
7009	45	0.00	0.00	0.00	0.00	45
7010	27	0.00	0.00	0.00	0.00	27
7011	36	0.00	0.00	0.00	5.40	36

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

ALTERNATIVE 2

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HU2 UNIT#	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
7012	44	25.00	25.00 (RC&YC)	25.00	0.00	19
7013	45	0.00	0.00	0.00	0.00	45
7014	37	0.00	0.00	0.00	0.00	37
7016	18	0.00	0.00	0.00	0.00	18
7017	70	0.00	47.00 (YC)	47.00	0.00	23
7019	30	0.00	0.00	0.00	0.00	30
7021	59	0.00	0.00	0.00	6.00	59
7022	32	0.00	0.00	0.00	0.60	32
7023	74	0.00	0.00	0.00	0.00	74
7024	26	0.00	0.00	0.00	0.00	26
7025	20	0.00	0.00	0.00	4.00	20
7026	69	0.00	0.00	0.00	0.00	69
7027	35	0.00	0.00	0.00	0.00	35
7028	14	0.00	0.00	0.00	0.00	14
7029	17	0.00	7.00	7.00	0.00	10
7030	44	0.00	0.00	0.00	3.80	44
7031	35	0.00	0.00	0.00	0.00	35
7032	58	0.00	0.00	0.00	0.00	58
7033	33	0.00	0.00	0.00	4.20	33
7034	24	0.00	16.00 (YC)	16.00	0.00	8
7035	32	0.00	0.00	0.00	0.00	32
7036	46	0.00	0.00	0.00	0.00	46
7037	35	0.00	0.00	0.00	0.00	35
7038	52	0.00	0.00	0.00	4.00	52
7039	11	0.00	0.00	0.00	0.00	11
7518	14	0.00	0.00	0.00	0.00	14
8001	27	0.00	0.00	0.00	0.00	27
8002	4	0.00	0.00	0.00	0.00	4
8003	68	0.00	0.00	0.00	0.00	68
8004	17	0.00	0.00	0.00	0.00	17
8005	36	0.00	0.00	0.00	0.00	36
8006	86	0.00	0.00	0.00	0.00	86
8007	54	0.00	0.00	0.00	0.00	54
8008	58	0.00	0.00	0.00	0.00	58
8009	46	0.00	0.00	0.00	0.00	46
8010	38	0.00	0.00	0.00	0.00	38
8011	62	0.00	0.00	0.00	3.80	62
8012	51	21.00	21.00 (RC&YC)	21.00	0.00	30
8013	39	0.00	0.00	0.00	0.00	39

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

ALTERNATIVE 2

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HU2 UNIT#	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
8014	26	0.00	0.00	0.00	0.00	26
8015	19	0.00	0.00	0.00	0.00	19
8016	40	0.00	0.00	0.00	0.00	40
8017	35	0.00	0.00	0.00	5.60	35
8018	75	0.00	0.00	0.00	0.00	75
8019	34	0.00	0.00	0.00	6.80	34
8020	23	0.00	0.00	0.00	0.00	23
8021	24	0.00	0.00	0.00	0.00	24
8022	68	0.00	0.00	0.00	0.00	68
8023	89	0.00	0.00	0.00	0.00	89
8024	15	0.00	0.00	0.00	0.00	15
8025	43	0.00	0.00	0.00	0.00	43
8026	19	0.00	0.00	0.00	0.00	19
8027	56	0.00	0.00	0.00	0.00	56
8028	7	0.00	0.00	0.00	0.00	7
8029	106	0.00	0.00	0.00	12.80	106
8030	14	0.00	0.00	0.00	0.00	14
8031	11	0.00	0.00	0.00	0.00	11
8032	17	0.00	0.00	0.00	0.00	17
8033	8	0.00	0.00	0.00	0.00	8
8034	39	0.00	0.00	0.00	5.20	39
8035	90	0.00	0.00	0.00	16.40	90
8036	27	0.00	0.00	0.00	0.00	27
8038	134	0.00	0.00	0.00	20.00	134
8039	29	0.00	0.00	0.00	0.00	29
8040	103	0.00	0.00	0.00	11.40	103
8041	44	0.00	0.00	0.00	0.00	44
8044	33	0.00	0.00	0.00	0.00	33
8045	10	0.00	0.00	0.00	0.00	10
8046	37	0.00	0.00	0.00	0.00	37
8047	15	0.00	0.00	0.00	0.00	15
8048	37	0.00	0.00	0.00	0.00	37
8049	12	0.00	0.00	0.00	0.00	12
8050	9	0.00	0.00	0.00	0.00	9
8051	47	0.00	0.00	0.00	9.40	47
8052	19	0.00	0.00	0.00	0.00	19
8053	90	0.00	0.00	0.00	0.00	90
8054	62	0.00	0.00	0.00	0.00	62
8055	43	0.00	0.00	0.00	8.60	43

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

ALTERNATIVE 2

PAGE 5 OF 6

HU2 UNIT#	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
8058	15	0.00	0.00	0.00	0.00	15
8537	87	0.00	0.00	0.00	18.00	87
9001	53	0.00	0.00	0.00	0.00	53
9002	19	0.00	0.00	0.00	0.00	19
9003	25	0.00	0.00	0.00	5.00	25
9004	28	0.00	0.00	0.00	0.00	28
9005	61	0.00	0.00	0.00	2.80	61
9006	13	0.00	0.00	0.00	0.00	13
9007	11	0.00	0.00	0.00	0.00	11
9008	27	0.00	0.00	0.00	0.00	27
9009	62	0.00	0.00	0.00	5.00	62
9010	22	0.00	5.00 (SS)	5.00	0.00	17
9011	14	0.00	0.00	0.00	0.00	14
9012	47	0.00	16.00 (YC)	16.00	6.00	31
9013	14	0.00	0.00	0.00	0.00	14
9014	44	0.00	0.00	0.00	8.80	44
9015	19	0.00	0.00	0.00	3.80	19
9016	24	0.00	0.00	0.00	4.80	24
9017	16	0.00	0.00	0.00	0.00	16
9018	45	0.00	0.00	0.00	0.00	45
9019	38	0.00	0.00	0.00	0.00	38
9020	36	0.00	0.00	0.00	0.00	36
9021	25	0.00	0.00	0.00	0.00	25
9022	47	0.00	0.00	0.00	3.20	47
9023	49	0.00	0.00	0.00	0.00	49
9024	31	0.00	0.00	0.00	3.20	31
9025	35	0.00	0.00	0.00	2.80	35
9026	38	0.00	0.00	0.00	0.00	38
9027	63	0.00	20.00 (SS)	20.00	10.60	43
9028	23	0.00	23.00 (SS)	23.00	0.00	0
9030	57	0.00	0.00	0.00	6.80	57
9031	52	0.00	0.00	0.00	7.80	52
9032	42	0.00	0.00	0.00	0.00	42
9033	16	0.00	0.00	0.00	0.00	16
9034	36	0.00	0.00	0.00	7.20	36
9035	16	0.00	0.00	0.00	3.20	16
9036	26	0.00	0.00	0.00	0.00	26
9037	21	0.00	0.00	0.00	0.00	21
9038	114	0.00	0.00	0.00	10.80	114

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

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HU2 UNIT#	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
9039	69	0.00	0.00	0.00	13.80	69
9040	40	0.00	0.00	0.00	0.00	40
9041	19	0.00	0.00	0.00	0.00	19
9042	19	0.00	0.00	0.00	0.00	19
9043	21	0.00	0.00	0.00	0.00	21
9044	70	0.00	0.00	0.00	5.40	70
9045	85	0.00	0.00	0.00	11.80	85
9046	42	0.00	0.00	0.00	3.80	42
9047	67	0.00	0.00	0.00	5.60	67
9529	100	0.00	30.00	30.00	0.00	70
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	8232	154.00	356.00	356.00	457.40	7,876

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

ALTERNATIVE 3

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
3005	32	0.00	0.00	0.00	0.00	32
3006	119	0.00	0.00	0.00	0.00	119
3014	18	0.00	0.00	0.00	0.00	18
3016	20	0.00	0.00	0.00	0.00	20
3017	38	0.00	0.00	0.00	0.00	38
3019	37	0.00	0.00	0.00	7.40	37
3020	66	0.00	0.00	0.00	0.00	66
3021	66	0.00	0.00	0.00	0.00	66
3022	76	0.00	0.00	0.00	0.00	76
3033	62	0.00	0.00	0.00	5.60	62
4006	58	0.00	0.00	0.00	7.20	58
5003	13	0.00	0.00	0.00	0.00	13
5008	62	40.00	40.00 (RC&YC)	40.00	0.00	22
5022	7	0.00	0.00	0.00	0.00	7
5024	67	0.00	0.00	0.00	13.40	67
5026	58	0.00	0.00	0.00	0.00	58
5027	103	0.00	0.00	0.00	8.60	103
5028	21	0.00	0.00	0.00	0.00	21
5029	32	0.00	0.00	0.00	0.00	32
5030	17	0.00	0.00	0.00	0.00	17
5031	2	0.00	0.00	0.00	0.00	2
5032	57	0.00	0.00	0.00	0.00	57
5034	21	0.00	0.00	0.00	4.20	21
5501	26	0.00	0.00	0.00	0.00	26
5505	34	0.00	0.00	0.00	0.00	34
5560	26	0.00	0.00	0.00	0.00	26
6008	74	0.00	0.00	0.00	0.00	74
6017	24	0.00	0.00	0.00	0.00	24
6020	28	0.00	0.00	0.00	0.00	28
6021	36	0.00	0.00	0.00	7.20	36
6022	22	0.00	0.00	0.00	0.00	22
6023	10	0.00	0.00	0.00	0.00	10
6024	71	0.00	0.00	0.00	0.00	71
6025	52	0.00	0.00	0.00	0.00	52
6026	103	0.00	0.00	0.00	0.00	103
6027	37	0.00	0.00	0.00	0.00	37

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

ALTERNATIVE 3

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
6028	48	26.00	26.00 (RC&YC)	26.00	0.00	22
6029	42	0.00	0.00	0.00	0.00	42
6030	56	0.00	14.00 (YC)	14.00	2.80	42
6031	127	0.00	95.00 (YC)	95.00	5.60	32
6032	65	34.00	34.00	34.00	0.00	31
6038	22	0.00	0.00	0.00	2.00	22
7003	37	0.00	0.00	0.00	0.00	37
7016	18	0.00	0.00	0.00	0.00	18
7040	32	0.00	0.00	0.00	6.40	32
7041	26	0.00	0.00	0.00	0.00	26
7042	70	0.00	0.00	0.00	7.60	70
7043	48	0.00	0.00	0.00	0.00	48
7044	36	0.00	0.00	0.00	5.40	36
7045	25	25.00	25.00 (RC&YC)	25.00	0.00	0
7046	35	0.00	0.00	0.00	0.00	35
7047	50	0.00	0.00	0.00	0.00	50
7048	33	0.00	26.00 (YC)	26.00	0.00	7
7049	20	0.00	20.00 (YC)	20.00	4.00	0
7050	55	0.00	24.00 (YC)	24.00	0.00	31
8002	4	0.00	0.00	0.00	0.00	4
8003	68	0.00	0.00	0.00	0.00	68
8009	46	0.00	0.00	0.00	0.00	46
8011	62	0.00	0.00	0.00	3.80	62
8014	26	0.00	0.00	0.00	0.00	26
8015	19	0.00	0.00	0.00	0.00	19
8016	40	0.00	0.00	0.00	0.00	40
8025	43	0.00	0.00	0.00	0.00	43
8030	14	0.00	0.00	0.00	0.00	14
8045	10	0.00	0.00	0.00	0.00	10
8056	64	0.00	0.00	0.00	0.00	64
8057	76	0.00	0.00	0.00	0.00	76
8058	15	0.00	0.00	0.00	0.00	15
8060	36	0.00	0.00	0.00	4.20	36
8061	26	0.00	0.00	0.00	5.20	26
8062	98	0.00	0.00	0.00	4.20	98
8063	47	0.00	0.00	0.00	0.00	47

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
8064	53	0.00	0.00	0.00	0.00	53
8065	30	0.00	0.00	0.00	0.00	30
8066	47	0.00	0.00	0.00	2.20	47
8067	15	0.00	0.00	0.00	0.00	15
8068	33	0.00	0.00	0.00	6.60	33
8069	117	0.00	0.00	0.00	13.40	117
8070	35	35.00	35.00 (RC&YC)	35.00	0.00	0
8071	41	0.00	0.00	0.00	0.00	41
8072	39	0.00	0.00	0.00	0.00	39
8073	28	0.00	0.00	0.00	5.60	28
8074	45	0.00	0.00	0.00	9.00	45
8075	56	0.00	0.00	0.00	2.80	56
8076	128	0.00	0.00	0.00	20.40	128
8077	73	0.00	0.00	0.00	5.80	73
8078	35	0.00	0.00	0.00	0.00	35
8079	115	0.00	0.00	0.00	15.60	115
8080	39	0.00	0.00	0.00	3.40	39
9002	19	0.00	0.00	0.00	0.00	19
9003	25	0.00	0.00	0.00	5.00	25
9019	38	0.00	0.00	0.00	0.00	38
9021	25	0.00	0.00	0.00	0.00	25
9026	38	0.00	0.00	0.00	0.00	38
9028	23	0.00	23.00 (SS)	23.00	0.00	0
9031	52	0.00	0.00	0.00	7.80	52
9037	21	0.00	0.00	0.00	0.00	21
9040	40	0.00	0.00	0.00	0.00	40
9041	19	0.00	0.00	0.00	0.00	19
9043	21	0.00	0.00	0.00	0.00	21
9044	70	0.00	0.00	0.00	5.40	70
9048	65	0.00	0.00	0.00	2.80	65
9049	33	0.00	0.00	0.00	0.00	33
9050	49	0.00	0.00	0.00	0.00	49
9051	83	0.00	42.00 (SS&YC)	42.00	10.00	41
9052	88	0.00	0.00	0.00	5.00	88
9053	18	0.00	0.00	0.00	0.00	18
9054	72	0.00	16.00 (YC)	16.00	11.00	56
9055	80	0.00	17.00 (SS)	17.00	0.00	63

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
9056	30	0.00	0.00	0.00	0.00	30
9057	108	0.00	0.00	0.00	10.80	108
9058	42	0.00	0.00	0.00	7.20	42
9059	108	0.00	8.00 (SS)	8.00	10.80	100
9060	27	0.00	30.00 (SS)	30.00	6.00	-3
9061	31	0.00	0.00	0.00	0.00	31
9062	93	0.00	20.00 (SS)	20.00	10.60	73
9063	16	0.00	0.00	0.00	3.20	16
9064	83	0.00	0.00	0.00	3.40	83
9065	17	0.00	0.00	0.00	0.00	17
9066	24	0.00	0.00	0.00	0.00	24
9067	71	0.00	0.00	0.00	3.80	71
9068	12	0.00	0.00	0.00	0.00	12
9069	33	0.00	0.00	0.00	0.00	33
9107	97	0.00	0.00	0.00	11.80	97
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	5734	160.00	495.00	495.00	304.20	5239

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
3001	20	0.00	0.00	0.00	4.00	20
3002	27	0.00	0.00	0.00	5.40	27
3003	106	0.00	0.00	0.00	21.20	106
3006	119	0.00	0.00	0.00	0.00	119
3007	91	0.00	0.00	0.00	0.00	91
3010	50	0.00	0.00	0.00	1.40	50
3020	66	0.00	0.00	0.00	0.00	66
3023	50	0.00	0.00	0.00	0.00	50
3024	73	0.00	0.00	0.00	14.60	73
3035	68	0.00	0.00	0.00	0.00	68
3036	37	0.00	0.00	0.00	0.00	37
3037	43	0.00	0.00	0.00	0.00	43
3038	43	0.00	0.00	0.00	0.00	43
3039	80	0.00	0.00	0.00	10.60	80
4002	57	0.00	0.00	0.00	9.60	57
4004	17	0.00	0.00	0.00	0.00	17
4007	95	0.00	0.00	0.00	9.00	95
5003	13	0.00	0.00	0.00	0.00	13
5006	23	0.00	0.00	0.00	0.00	23
5007	46	0.00	0.00	0.00	9.20	46
5008	62	40.00	40.00	40.00	0.00	22
5009	24	0.00	0.00	0.00	0.00	24
5010	12	0.00	0.00	0.00	0.00	12
5019	41	0.00	0.00	0.00	0.00	41
5020	13	0.00	0.00	0.00	0.00	13
5021	3	0.00	0.00	0.00	0.00	3
5022	7	0.00	0.00	0.00	0.00	7
5023	101	0.00	0.00	0.00	0.00	101
5028	21	0.00	0.00	0.00	0.00	21
5035	36	0.00	0.00	0.00	7.20	36
5037	45	0.00	0.00	0.00	0.00	45
5038	61	0.00	0.00	0.00	12.20	61
5044	31	0.00	0.00	0.00	6.20	31
5053	14	0.00	0.00	0.00	0.00	14
5054	13	0.00	0.00	0.00	0.00	13
5055	39	0.00	0.00	0.00	0.00	39

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

ALTERNATIVE 4

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
5056	51	0.00	0.00	0.00	0.00	51
5501	26	0.00	0.00	0.00	0.00	26
5505	34	0.00	0.00	0.00	0.00	34
5526	26	0.00	0.00	0.00	0.00	26
5550	32	0.00	0.00	0.00	0.00	32
5551	51	0.00	0.00	0.00	0.00	51
6002	44	0.00	0.00	0.00	0.00	44
6003	72	0.00	0.00	0.00	14.40	72
6004	78	48.00	48.00 (RC&YC)	48.00	12.60	30
6007	48	0.00	0.00	0.00	9.60	48
6014	39	0.00	0.00	0.00	3.00	39
6024	71	0.00	0.00	0.00	0.00	71
6028	48	26.00	26.00 (RC&YC)	26.00	0.00	22
6029	42	0.00	0.00	0.00	0.00	42
6031	127	0.00	95.00 (YC)	95.00	5.60	32
6038	22	0.00	0.00	0.00	2.00	22
6052	86	0.00	14.00 (YC)	14.00	6.60	72
6053	25	0.00	0.00	0.00	0.00	25
6054	11	0.00	0.00	0.00	0.00	11
6055	59	0.00	0.00	0.00	0.00	59
7000	14	0.00	0.00	0.00	0.00	14
7008	14	0.00	0.00	0.00	0.00	14
7009	45	0.00	0.00	0.00	0.00	45
7028	14	0.00	0.00	0.00	0.00	14
7030	44	0.00	0.00	0.00	3.80	44
7031	35	0.00	0.00	0.00	0.00	35
7034	24	0.00	16.00 (YC)	16.00	0.00	8
7035	32	0.00	0.00	0.00	0.00	32
7036	46	0.00	0.00	0.00	5.20	46
7042	70	0.00	0.00	0.00	7.60	70
7044	36	0.00	0.00	0.00	5.40	36
7045	25	25.00	25.00 (RC&YC)	25.00	0.00	0
7046	35	0.00	0.00	0.00	0.00	35
7050	55	0.00	24.00 (YC)	24.00	0.00	31
7053	67	0.00	0.00	0.00	6.00	67
7056	46	0.00	0.00	0.00	9.20	46

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

ALTERNATIVE 4

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
7057	11	0.00	0.00	0.00	0.00	11
7085	61	0.00	0.00	0.00	0.00	61
7086	63	0.00	0.00	0.00	0.00	63
7087	19	0.00	0.00	0.00	0.00	19
7089	40	0.00	0.00	0.00	0.00	40
7090	9	0.00	0.00	0.00	0.00	9
7091	83	0.00	0.00	0.00	0.00	83
7092	57	0.00	0.00	0.00	9.00	57
7093	96	0.00	0.00	0.00	0.00	96
7094	134	0.00	0.00	0.00	0.00	134
7095	62	0.00	0.00	0.00	0.00	62
7096	37	0.00	0.00	0.00	0.00	37
7097	88	0.00	0.00	0.00	3.40	88
7099	15	0.00	0.00	0.00	0.00	15
7598	29	0.00	14.00 (YC)	14.00	5.60	15
8002	4	0.00	0.00	0.00	0.00	4
8003	68	0.00	0.00	0.00	0.00	68
8008	58	0.00	0.00	0.00	0.00	58
8009	46	0.00	0.00	0.00	0.00	46
8011	62	0.00	0.00	0.00	3.80	62
8015	19	0.00	0.00	0.00	0.00	19
8016	40	0.00	0.00	0.00	0.00	40
8018	75	0.00	0.00	0.00	0.00	75
8022	68	0.00	0.00	0.00	0.00	68
8024	15	0.00	0.00	0.00	0.00	15
8025	43	0.00	0.00	0.00	0.00	43
8026	19	0.00	0.00	0.00	0.00	19
8027	56	0.00	0.00	0.00	0.00	56
8036	27	0.00	0.00	0.00	0.00	27
8041	44	0.00	0.00	0.00	0.00	44
8065	30	0.00	0.00	0.00	0.00	30
8073	28	0.00	0.00	0.00	5.60	28
8102	26	0.00	0.00	0.00	5.20	26
8109	43	0.00	0.00	0.00	8.60	43
8110	40	0.00	0.00	0.00	0.00	40
8111	14	0.00	0.00	0.00	0.00	14

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
8112	146	0.00	0.00	0.00	19.20	146
8113	107	0.00	0.00	0.00	15.60	107
8114	81	0.00	0.00	0.00	5.80	81
8115	81	0.00	0.00	0.00	12.20	81
8116	28	0.00	0.00	0.00	0.00	28
8117	34	0.00	0.00	0.00	3.40	34
9000	68	0.00	0.00	0.00	0.00	68
9045	85	0.00	0.00	0.00	11.80	85
9049	33	0.00	0.00	0.00	0.00	33
9050	49	0.00	0.00	0.00	0.00	49
9051	83	0.00	42.00 (SS&YC)	42.00	10.00	41
9052	88	0.00	0.00	0.00	5.00	88
9067	71	0.00	0.00	0.00	3.80	71
9104	75	0.00	0.00	0.00	5.40	75
9105	21	0.00	0.00	0.00	0.00	21
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	5920	139.00	344.00	344.00	335.00	5576

NORTH REVILLA PROJECT AREA
PROPOSED ESSENTIAL REFORESTATION PROJECTS

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
2001	47	0.00	0.00	0.00	9.40	47
2003	40	0.00	28.00 (YC)	28.00	8.00	12
2006	48	0.00	0.00	0.00	0.00	48
2008	29	0.00	19.00 (YC)	19.00	0.00	10
2009	91	0.00	0.00	0.00	0.00	91
2011	39	0.00	0.00	0.00	7.80	39
2012	20	0.00	0.00	0.00	4.00	20
2013	28	0.00	28.00 (SS)	28.00	5.60	0
2510	29	21.00	21.00 (RC&YC)	21.00	0.00	8
3007	91	0.00	0.00	0.00	0.00	91
3008	49	0.00	0.00	0.00	9.80	49
3011	46	0.00	0.00	0.00	7.40	46
3027	102	0.00	0.00	0.00	0.00	102
3028	21	0.00	0.00	0.00	0.00	21
3029	25	0.00	0.00	0.00	0.00	25
3030	45	0.00	0.00	0.00	0.00	45
3031	29	0.00	0.00	0.00	0.00	29
3032	32	0.00	0.00	0.00	0.00	32
3033	62	0.00	0.00	0.00	5.60	62
3034	38	0.00	0.00	0.00	0.00	38
3035	68	0.00	0.00	0.00	0.00	68
3036	37	0.00	0.00	0.00	0.00	37
4002	57	0.00	0.00	0.00	9.60	57
4004	17	0.00	0.00	0.00	0.00	17
4007	95	0.00	0.00	0.00	9.00	95
5003	13	0.00	0.00	0.00	0.00	13
5019	41	0.00	0.00	0.00	0.00	41
5021	3	0.00	0.00	0.00	0.00	3
5022	7	0.00	0.00	0.00	0.00	7
5028	21	0.00	0.00	0.00	0.00	21
5043	28	0.00	0.00	0.00	2.40	28
5044	31	0.00	0.00	0.00	6.20	31
5045	5	0.00	0.00	0.00	0.00	5
5048	28	0.00	0.00	0.00	0.00	28
5055	39	0.00	0.00	0.00	0.00	39
5057	2	0.00	0.00	0.00	0.00	2

NORTH REVILLA PROJECT AREA
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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
5540	26	0.00	0.00	0.00	0.00	26
5541	56	0.00	0.00	0.00	3.00	56
6002	44	0.00	0.00	0.00	0.00	44
6027	37	0.00	0.00	0.00	0.00	37
6033	14	0.00	0.00	0.00	0.00	14
6034	13	0.00	0.00	0.00	0.00	13
6035	44	14.00	14.00 (RC&YC)	14.00	5.80	30
6036	22	0.00	0.00	0.00	0.00	22
6037	23	0.00	0.00	0.00	0.00	23
6038	22	0.00	0.00	0.00	2.00	22
6039	30	0.00	0.00	0.00	3.80	30
6040	34	34.00	34.00 (RC&YC)	34.00	0.00	0
6041	89	0.00	68.00 (YC)	68.00	9.80	21
6042	11	0.00	0.00	0.00	0.00	11
6043	11	0.00	0.00	0.00	0.00	11
6044	17	0.00	0.00	0.00	0.00	17
6045	18	0.00	0.00	0.00	0.00	18
6046	15	0.00	0.00	0.00	0.00	15
6047	19	0.00	0.00	0.00	0.00	19
6048	44	0.00	0.00	0.00	0.00	44
6049	20	0.00	0.00	0.00	0.00	20
6050	27	0.00	0.00	0.00	0.00	27
6051	56	0.00	0.00	0.00	3.20	56
7001	66	0.00	0.00	0.00	8.20	66
7002	33	0.00	0.00	0.00	0.00	33
7003	37	0.00	0.00	0.00	0.00	37
7004	22	0.00	0.00	0.00	0.00	22
7005	26	0.00	0.00	0.00	0.00	26
7007	16	0.00	0.00	0.00	0.00	16
7008	14	0.00	0.00	0.00	0.00	14
7012	44	25.00	25.00 (RC&YC)	25.00	0.00	19
7016	18	0.00	0.00	0.00	0.00	18
7018	21	0.00	14.00 (YC)	14.00	5.60	7
7019	30	0.00	0.00	0.00	0.00	30
7021	59	0.00	0.00	0.00	6.00	59
7025	20	0.00	0.00	0.00	4.00	20
7028	14	0.00	0.00	0.00	0.00	14

NORTH REVILLA PROJECT AREA
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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
7029	17	0.00	7.00 (YC)	7.00	0.00	10
7030	44	0.00	0.00	0.00	3.80	44
7031	35	0.00	0.00	0.00	0.00	35
7032	58	0.00	0.00	0.00	0.00	58
7034	24	0.00	16.00 (YC)	16.00	0.00	8
7047	50	0.00	0.00	0.00	0.00	50
7054	16	0.00	0.00	0.00	0.00	16
7055	54	0.00	0.00	0.00	10.80	54
7057	11	0.00	0.00	0.00	0.00	11
7058	49	0.00	0.00	0.00	6.20	49
7059	13	0.00	0.00	0.00	0.00	13
7060	15	0.00	0.00	0.00	0.00	15
7061	9	0.00	0.00	0.00	0.00	9
7062	24	0.00	0.00	0.00	4.80	24
7063	9	0.00	0.00	0.00	0.00	9
7064	7	0.00	0.00	0.00	0.00	7
7065	13	13.00	13.00 (RC&YC)	13.00	1.40	0
7066	21	0.00	0.00	0.00	4.20	21
7067	18	0.00	0.00	0.00	0.00	18
7068	26	0.00	0.00	0.00	0.00	26
7069	17	0.00	0.00	0.00	0.00	17
7070	50	0.00	0.00	0.00	10.00	50
7071	30	0.00	0.00	0.00	0.00	30
7072	15	0.00	0.00	0.00	0.00	15
7073	63	0.00	0.00	0.00	0.00	63
7074	71	0.00	0.00	0.00	0.00	71
7075	26	0.00	26.00 (YC)	26.00	0.00	0
7076	20	0.00	0.00	0.00	0.00	20
7077	15	0.00	0.00	0.00	0.00	15
7078	16	0.00	0.00	0.00	0.00	16
7079	6	0.00	0.00	0.00	0.00	6
7080	6	0.00	0.00	0.00	0.00	6
7081	11	0.00	0.00	0.00	0.00	11
7082	8	0.00	0.00	0.00	0.00	8
7083	9	0.00	0.00	0.00	0.00	9
7084	42	0.00	0.00	0.00	0.00	42

NORTH REVILLA PROJECT AREA
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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
7101	66	0.00	0.00	0.00	13.20	66
8005	36	0.00	0.00	0.00	0.00	36
8008	58	0.00	0.00	0.00	0.00	58
8009	46	0.00	0.00	0.00	0.00	46
8011	62	0.00	0.00	0.00	3.80	62
8014	26	0.00	0.00	0.00	0.00	26
8015	19	0.00	0.00	0.00	0.00	19
8025	43	0.00	0.00	0.00	0.00	43
8026	19	0.00	0.00	0.00	0.00	19
8027	56	0.00	0.00	0.00	0.00	56
8028	7	0.00	0.00	0.00	0.00	7
8031	11	0.00	0.00	0.00	0.00	11
8033	8	0.00	0.00	0.00	0.00	8
8035	90	0.00	0.00	0.00	16.40	90
8041	44	0.00	0.00	0.00	0.00	44
8044	33	0.00	0.00	0.00	0.00	33
8046	37	0.00	0.00	0.00	0.00	37
8048	37	0.00	0.00	0.00	0.00	37
8070	35	35.00	35.00 (RC&YC)	35.00	0.00	0
8073	28	0.00	0.00	0.00	5.60	28
8083	26	0.00	0.00	0.00	0.00	26
8084	24	0.00	0.00	0.00	0.00	24
8085	6	0.00	0.00	0.00	0.00	6
8087	21	0.00	0.00	0.00	4.20	21
8088	52	0.00	0.00	0.00	0.00	52
8089	42	0.00	0.00	0.00	0.00	42
8090	20	0.00	0.00	0.00	0.00	20
8091	44	0.00	0.00	0.00	0.00	44
8092	42	0.00	0.00	0.00	0.00	42
8093	48	0.00	0.00	0.00	0.00	48
8094	15	0.00	0.00	0.00	0.00	15
8095	14	0.00	0.00	0.00	0.00	14
8096	17	0.00	0.00	0.00	0.00	17
8098	84	0.00	0.00	0.00	3.00	84
8100	54	0.00	0.00	0.00	2.40	54
8101	18	0.00	0.00	0.00	0.00	18

NORTH REVILLA PROJECT AREA
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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
8102	26	0.00	0.00	0.00	5.20	26
8103	22	0.00	0.00	0.00	0.00	22
8104	132	0.00	0.00	0.00	21.20	132
8105	35	0.00	0.00	0.00	4.20	35
8106	43	0.00	0.00	0.00	0.00	43
8107	31	0.00	0.00	0.00	0.00	31
8108	34	0.00	0.00	0.00	0.00	34
8118	61	0.00	0.00	0.00	5.80	61
8119	21	0.00	0.00	0.00	0.00	21
9004	28	0.00	0.00	0.00	0.00	28
9006	13	0.00	0.00	0.00	0.00	13
9010	22	0.00	5.00 (SS)	5.00	0.00	17
9013	14	0.00	0.00	0.00	0.00	14
9014	44	0.00	0.00	0.00	8.80	44
9015	19	0.00	0.00	0.00	3.80	19
9016	24	0.00	0.00	0.00	4.80	24
9021	25	0.00	0.00	0.00	0.00	25
9022	47	0.00	0.00	0.00	3.20	47
9026	38	0.00	0.00	0.00	0.00	38
9027	63	0.00	20.00 (SS)	20.00	10.60	43
9031	52	0.00	0.00	0.00	7.80	52
9034	36	0.00	0.00	0.00	7.20	36
9049	33	0.00	0.00	0.00	0.00	33
9053	18	0.00	0.00	0.00	0.00	18
9057	108	0.00	0.00	0.00	10.80	108
9068	12	0.00	0.00	0.00	0.00	12
9069	33	0.00	0.00	0.00	0.00	33
9075	56	0.00	0.00	0.00	5.40	56
9076	35	0.00	0.00	0.00	0.00	35
9079	62	0.00	0.00	0.00	5.00	62
9080	28	0.00	0.00	0.00	0.00	28
9081	8	0.00	0.00	0.00	0.00	8
9083	21	0.00	0.00	0.00	0.00	21
9084	113	0.00	0.00	0.00	0.00	113
9085	63	0.00	61.00 (SS)	61.00	12.20	2
9086	32	0.00	0.00	0.00	6.40	32
9087	69	0.00	46.00 (SS)	46.00	9.20	23

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
9088	25	0.00	0.00	0.00	0.00	25
9090	24	0.00	0.00	0.00	0.00	24
9091	76	0.00	0.00	0.00	0.00	76
9092	20	0.00	0.00	0.00	0.00	20
9093	6	0.00	0.00	0.00	0.00	6
9108	31	0.00	0.00	0.00	0.00	31
=====	=====	=====	=====	=====	=====	=====
	6424	142.00	480.00	480.00	357.60	5944

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
3005	32	0.00	0.00	0.00	0.00	32
3006	119	0.00	0.00	0.00	0.00	119
3007	91	0.00	0.00	0.00	0.00	91
3010	50	0.00	0.00	0.00	0.00	50
3014	18	0.00	0.00	0.00	0.00	18
3016	20	0.00	0.00	0.00	0.00	20
3019	37	0.00	0.00	0.00	7.40	37
3020	66	0.00	0.00	0.00	0.00	66
3021	66	0.00	0.00	0.00	0.00	66
3023	50	0.00	0.00	0.00	0.00	50
3024	73	0.00	0.00	0.00	14.60	73
3025	84	0.00	0.00	0.00	5.60	84
3026	91	0.00	0.00	0.00	10.60	91
4006	58	0.00	0.00	0.00	7.20	58
5003	13	0.00	0.00	0.00	0.00	13
5008	62	40.00	40.00 (RC&YC)	40.00	0.00	22
5009	24	0.00	0.00	0.00	0.00	24
5022	7	0.00	0.00	0.00	0.00	7
5024	67	0.00	0.00	0.00	13.40	67
5026	58	0.00	0.00	0.00	0.00	58
5027	103	0.00	0.00	0.00	8.60	103
5028	21	0.00	0.00	0.00	0.00	21
5030	17	0.00	0.00	0.00	0.00	17
5031	2	0.00	0.00	0.00	0.00	2
5032	57	0.00	0.00	0.00	0.00	57
5034	21	0.00	0.00	0.00	0.00	21
5035	36	0.00	0.00	0.00	7.20	36
5037	45	0.00	0.00	0.00	0.00	45
5038	61	0.00	0.00	0.00	12.20	61
5501	26	0.00	0.00	0.00	0.00	26
5505	34	0.00	0.00	0.00	0.00	34
5525	40	0.00	0.00	0.00	0.00	40
5529	42	0.00	0.00	0.00	0.00	42
5536	14	0.00	0.00	0.00	0.00	14
6002	44	0.00	0.00	0.00	0.00	44
6003	72	0.00	0.00	0.00	14.40	72
6007	48	0.00	0.00	0.00	9.60	48

NORTH REVILLA PROJECT AREA
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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
6008	74	0.00	0.00	0.00	0.00	74
6011	49	0.00	0.00	0.00	0.00	49
6017	24	0.00	0.00	0.00	0.00	24
6020	28	0.00	0.00	0.00	0.00	28
6021	36	0.00	0.00	0.00	7.20	36
6022	22	0.00	0.00	0.00	0.00	22
6023	10	0.00	0.00	0.00	0.00	10
6024	71	0.00	0.00	0.00	0.00	71
6025	52	0.00	0.00	0.00	0.00	52
6027	37	0.00	0.00	0.00	0.00	37
6028	48	26.00	26.00 (RC&YC)	26.00	0.00	22
6029	42	0.00	0.00	0.00	0.00	42
6030	56	0.00	14.00 (YC)	14.00	0.00	42
6031	127	0.00	95.00 (YC)	95.00	5.60	32
6032	65	34.00	34.00 (RC&YC)	34.00	0.00	31
6513	21	0.00	10.00 (YC)	10.00	0.00	11
7009	45	0.00	0.00	0.00	0.00	45
7020	18	0.00	0.00	0.00	0.00	18
7040	32	0.00	0.00	0.00	6.40	32
7041	26	0.00	0.00	0.00	0.00	26
7042	70	0.00	0.00	0.00	7.60	70
7043	48	0.00	0.00	0.00	0.00	48
7044	36	0.00	0.00	0.00	5.40	36
7045	25	25.00	25.00 (RC&YC)	25.00	0.00	0
7046	35	0.00	0.00	0.00	0.00	35
7047	50	0.00	0.00	0.00	0.00	50
7048	33	0.00	26.00 (YC)	26.00	0.00	7
7050	55	0.00	24.00 (YC)	24.00	0.00	31
7053	67	0.00	0.00	0.00	6.00	67
7551	58	0.00	0.00	0.00	0.00	58
7552	34	0.00	20.00 (YC)	20.00	0.00	14
8002	4	0.00	0.00	0.00	0.00	4
8003	68	0.00	0.00	0.00	0.00	68
8014	26	0.00	0.00	0.00	0.00	26
8015	19	0.00	0.00	0.00	0.00	19
8016	40	0.00	0.00	0.00	0.00	40

NORTH REVILLA PROJECT AREA
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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
8018	75	0.00	0.00	0.00	0.00	75
8022	68	0.00	0.00	0.00	0.00	68
8023	89	0.00	0.00	0.00	0.00	89
8024	15	0.00	0.00	0.00	0.00	15
8025	43	0.00	0.00	0.00	0.00	43
8026	19	0.00	0.00	0.00	0.00	19
8027	56	0.00	0.00	0.00	0.00	56
8030	14	0.00	0.00	0.00	0.00	14
8044	33	0.00	0.00	0.00	0.00	33
8045	10	0.00	0.00	0.00	0.00	10
8051	47	0.00	0.00	0.00	9.40	47
8056	64	0.00	0.00	0.00	0.00	64
8057	76	0.00	0.00	0.00	0.00	76
8058	15	0.00	0.00	0.00	0.00	15
8060	36	0.00	0.00	0.00	0.00	36
8063	47	0.00	0.00	0.00	0.00	47
8064	53	0.00	0.00	0.00	0.00	53
8065	30	0.00	0.00	0.00	0.00	30
8067	15	0.00	0.00	0.00	0.00	15
8068	33	0.00	0.00	0.00	6.60	33
8069	117	0.00	0.00	0.00	13.40	117
8071	41	0.00	0.00	0.00	0.00	41
8072	39	0.00	0.00	0.00	0.00	39
8073	28	0.00	0.00	0.00	5.60	28
8075	56	0.00	0.00	0.00	2.80	56
8076	128	0.00	0.00	0.00	20.40	128
8077	73	0.00	0.00	0.00	5.80	73
8078	35	0.00	0.00	0.00	0.00	35
8080	39	0.00	0.00	0.00	0.00	39
8081	82	0.00	0.00	0.00	0.00	82
8082	93	0.00	0.00	0.00	11.20	93
8574	33	0.00	0.00	0.00	6.60	33
9002	19	0.00	0.00	0.00	0.00	19
9003	25	0.00	0.00	0.00	5.00	25
9019	38	0.00	0.00	0.00	0.00	38
9021	25	0.00	0.00	0.00	0.00	25

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UNIT NUMBER	UNIT ACRES	SITE PREP	PLANT	PLANT SURVEY	RELEASE & WEED	REGEN SURVEY
9022	47	0.00	0.00	0.00	0.00	47
9026	38	0.00	0.00	0.00	0.00	38
9028	23	0.00	23.00 (SS)	23.00	0.00	0
9031	52	0.00	0.00	0.00	7.80	52
9037	21	0.00	0.00	0.00	0.00	21
9044	70	0.00	0.00	0.00	5.40	70
9049	33	0.00	0.00	0.00	0.00	33
9050	49	0.00	0.00	0.00	0.00	49
9051	83	0.00	42.00 (SS&YC)	42.00	10.00	41
9052	88	0.00	0.00	0.00	5.00	88
9053	18	0.00	0.00	0.00	0.00	18
9054	72	0.00	16.00 (YC)	16.00	11.00	56
9057	108	0.00	0.00	0.00	10.80	108
9058	42	0.00	0.00	0.00	7.20	42
9059	108	0.00	8.00 (SS)	8.00	10.80	100
9060	27	0.00	30.00 (SS)	30.00	6.00	-3
9061	31	0.00	0.00	0.00	0.00	31
9062	93	0.00	20.00 (SS)	20.00	10.60	73
9064	83	0.00	0.00	0.00	0.00	83
9065	17	0.00	0.00	0.00	0.00	17
9067	71	0.00	0.00	0.00	0.00	71
9068	12	0.00	0.00	0.00	0.00	12
9071	72	0.00	0.00	0.00	14.40	72
9072	73	0.00	0.00	0.00	0.00	73
9073	50	0.00	0.00	0.00	0.00	50
9074	55	0.00	0.00	0.00	11.00	55
9107	97	0.00	0.00	0.00	11.80	97
9569	6	0.00	0.00	0.00	0.00	6
=====	=====	=====	=====	=====	=====	=====
	6568	125.00	453.00	453.00	357.60	6115

Appendix J

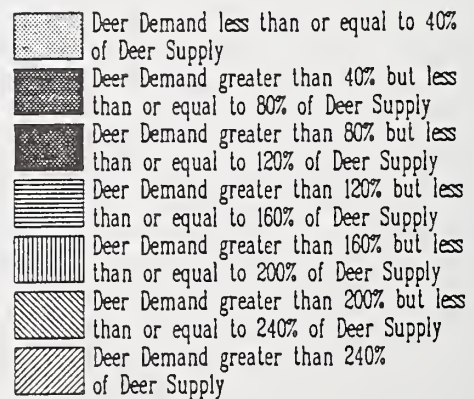
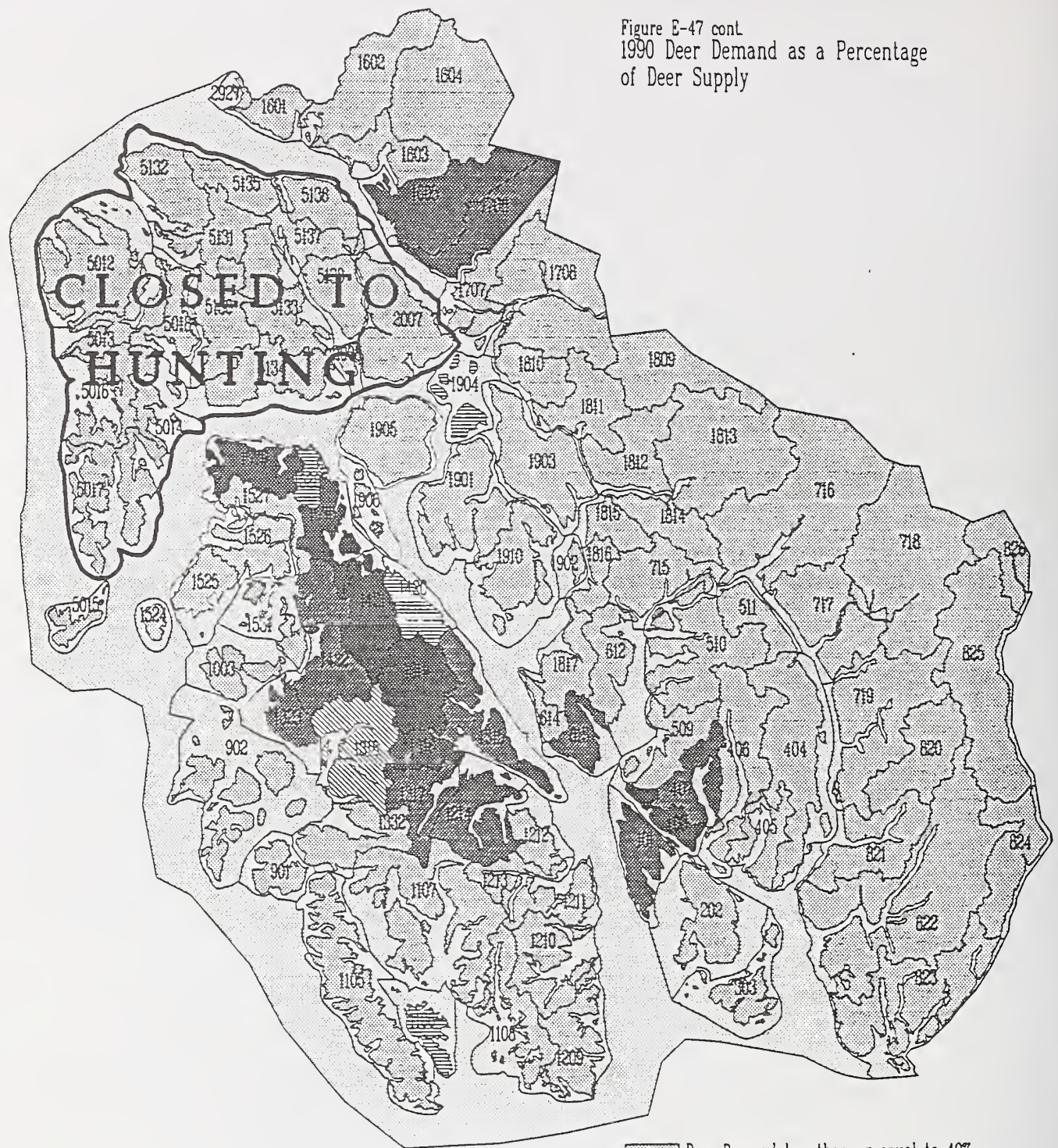
Deer Availability/ Deer Demand Maps



Deer Demand as a Percentage of Deer Supply: 1990 and 2040

SOURCE: ADF&G Division of Subsistence, Toss
Analysis Maps, Chatham Area GIS

Figure E-47 cont.
1990 Deer Demand as a Percentage
of Deer Supply

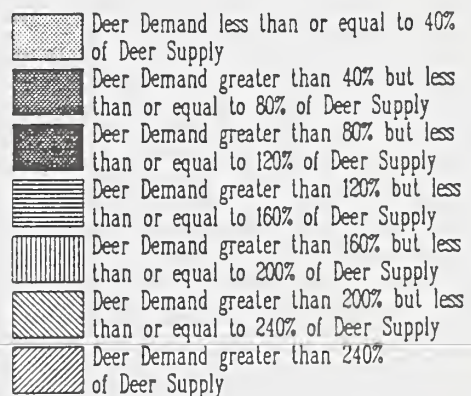


Note: This map displays deer demand (projected harvest) as a percentage of the 1990 deer supply (10% of the habitat capability) for each Wildlife Analysis Area (WAA). Areas where demand for deer exceeds 120 percent of the WAA supply, indicate that existing deer habitat is not sufficient to sustain present harvest levels. Harvest data is from Alaska Dept. of Fish and Game (ADF&G) 1987-1990 deer hunter surveys; deer habitat capability estimates are from the Tongass Land Management Plan Revision (TLMP).
Source: ADF&G Div. of Subsistence Toss Analysis Map III, Chatham Area GIS.

Figure E-48 cont.
2040 Projected Deer Demand as a Percentage
of Deer Supply



0 12.5 25 Miles



Note: This map displays deer demand (1987-90 mean harvest) versus deer supply (10% of habitat capability) 50 years from now for each Wildlife Analysis Area (WAA). Demand is assumed to increase with projected population growth at 18% per decade through 2010 and 15% per decade through 2040. Areas where demand for deer exceeds 120 percent of the WAA supply, indicate that existing deer habitat is not sufficient to sustain present harvest levels. Harvest data is from Alaska Dept. of Fish and Game (ADF&G) 1987-1990 deer hunter surveys; deer habitat capability estimates are from the Tongass Land Management Plan Revision (TLMP).

Source: ADF&G Div. of Subsistence Toss Analysis Map 112, Chatham Area GIS.

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